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IN THIS ISSUE we publish an article on the impurities in commercial cyanide, which is a matter of direct practical importance to the large number of those who use this chemical in metallurgical work. Another article, by Mr. J. W. Mercer, will also be found well worthy of perusal by cyaniders; it is one of those records of experience with peculiar ores, such as is most helpful to the improvement of methods of treatment. If other engineers will submit the statement of their troubles and successes with the same professional spirit, we feel sure that it will contribute notably to progress in milling.

EXPERIMENTS WITH the oil concentration process carried out in London have been watched with keen interest on the part of metallurgical engineers. Several experienced men from this side have returned from London with favorable opinions of the process, and expressions of surprise at the unexpected features which it has developed in regard to selective action upon particular minerals. The promoters of the company controlling the process appear to have been most unfortunate in erecting their first working plants upon mines, which were moribund by reason of the very low grade of their ores, so that the collapse of the mines has naturally been mistaken as indicating the failure of the process which was expected to resuscitate them. We understand that both at Bisbee and Nacozari, and at the copper mines in New South Wales, it is intended to try the process on the close concentration of low grade pyritic ores containing copper. In British Columbia, the Le Roi No. 2 will have a plant ready in October next, so that a fair trial of a most fascinating method of ore treatment will be made. We hope to publish the results.

IT IS REPORTED that the Canadian government has taken up the plan for the organization of a mining department for the Dominion. This plan was urged at the annual meeting of the Canadian Mining Institute last year, and has also been advocated by several provincial associations. It is not stated whether the new department is to be a branch, or bureau, of the Geological Survey, as originally proposed; or whether it is to be entirely independent. In the latter case, the relations of such a department with the Provincial mining bureaus will have to be carefully adjusted, as the Dominion Government has direct jurisdiction over mining only in the Yukon and other territories.

IN OUR LIST of patents last week will be found one issued to an English inventor for a process of recovering gold from seawater. This is another evidence of the inclination of human nature to follow up the impracticable, in the vain hope of a golden reward. We do not know the party to whom the patent in question is issued, and credit him at least with taking it out in good faith. We do not find from his specifications that he has adopted the very practical method, used by some previous inventors; that is, to put the gold into the sea-water before he took it out for the benefit of credulous intending investors.

In this connection, it may interest a number of people, in Eastern Massachusetts and elsewhere, to learn that the Rev. Mr. Jernigan is now—according to a correspondent of the New York *Evening Post*—engaged in teaching letters and morality to young Filipinos. Whether he is still conducting experiments with sea-water, or whether he is pursuing those still more occult studies which took him to Paris, the correspondent does not explain.

IT IS UNDERSTOOD that the directors of the Dominion Steel Company and the Dominion Coal Company have agreed to cancel the lease of the coal company's property. The arrangement has not worked in an altogether satisfactory way, and under present conditions it is believed that the termination of the lease will result in improving the credit of both companies. The Dominion Steel Company at the present time is carrying a heavy floating debt, and an issue of bonds to fund this could hardly be made just now. The company, however, is really in better condition than the speculators in the Toronto and Montreal markets would have us believe. It has now reached the stage where production begins to be profitable, and where the heavy expenditures made upon its plant will begin to tell. With the assistance of the bounty from the Canadian government, there is little doubt that during the coming year a fair surplus can be earned and the company will be upon its way to a position where it will be able to meet its maturing obligations, although it may be some time before dividends will be reached. At any rate, there is a substantial value in the well-designed plant at Sydney, and in the ore and other properties owned. The works, moreover, are well situated to take advantage of the markets in the United States and Great Britain, besides supplying the Canadian demand. The Dominion Steel Company certainly has a future before it, and it is to be regretted that so much speculation and speculative interest has been mixed up with the commencement of its career.

Late advices from the Straits indicate that there is considerable dissatisfaction among the tin-miners of the Malay Peninsula on account of the new export tax on tin-ores, to which reference was recently made in our columns. This tax had the immediate effect of limiting the number of buyers of ores, and of putting the whole business into the hands of the two companies, which have smelting works at Singapore. These companies, the miners claim, will have a virtual monopoly and will be able to fix the prices in ores to suit themselves. Some of the larger operators had anticipated considerable benefit from the competition, which would have resulted, had an American company entered the market as a buyer of ores. This anticipation has fallen through, owing to the new tax, which effectually prevents any profitable shipment of ores. Protests have been made, but it is thought that they will have no effect upon the government. Many local merchants claim that this tax was imposed with the express purpose of shutting off American buying, and this view of the case really looks very probable.

In this connection it may be noted that the demand for Straits tin may still further increase, owing to the anticipated decline in the output of the metal from the Dutch East Indies. It is reported that the government sales of Banka and Billiton tin will be reduced considerably in quantity during the next half-year, owing to the shorter supply from those districts.

The latest purchase of the United States Steel Corporation, which has been under discussion for some time past, is that of a one-half interest in the Clairton Steel Company. This company, which was organized as subsidiary to the Crucible Steel Company of America, has recently completed a plant at Clairton, Pa., intended primarily for the production of open-hearth steel. The plant includes three blast furnaces of the largest type, capable of an output of 1,500 tons of pig iron daily. In addition to this there are twelve 50-ton open-hearth furnaces, which can turn out, when running full, 1,200 tons of steel in 24 hours. As these steel furnaces will require about 900 tons of pig daily, a surplus will be left for use in other plants. The United States Steel Corporaton purchases one-half interest in this plant with the right to take one-half the output. The Crucible Steel Company retains one-quarter interest, the remaining one-quarter being owned jointly by the Oliver Iron & Steel Company and W. P. Snyder & Company. The price paid by the Corporation is based on a valuation of $18,250,000, which is probably 50 per cent more than the actual cost of the plant. The only mill attached is one for rolling billets and tin-plate bars. The original plan was to add a mill for rolling structural steel, but this will not be carried out under the new arrangement. It is understood that the United States Corporation's share of the steel output will be taken mainly in the form of sheet-bars and tin-plate bars, which will be used in the Monessen plants of the American Steel & Wire Company and the American Tin-Plate Company. This purchase differs from all the recent investments of the Steel Corporation, in the fact that it carries with it no iron ore control and no ore lands.

COMPARISONS THAT MISLEAD.

In recent issues of one of the London financial daily papers we note certain vague but laudatory accounts of Alaskan mining, in the course of which it is stated that many of the mines can be operated, including all expenses of management, for less than $1 per ton of ore.

While yielding to none in our belief in the great mineral resources of Alaska and the excellent prospects for its successful development, we quote the above as the sort of statement which gives a handle to the organizers of worthless mines. The inference made at once is that all ore yielding a dollar, or more, per ton is profitable. Because the Alaska Treadwell works a $2 ore at a cost of $1.28 per ton, therefore, so we have seen it stated again and again, the Bullion Unlimited or the Great Wildcat Consolidated will yield handsome dividends on ore assaying $2, $2.50 or $3 per ton.

The fallacy of such reasoning is not apparent to the inexperienced investor, but it is no more sound than the average calculations of a boundless profit to be obtained from the breeding of chickens. The Alaska Treadwell, or any mine such as is, or will be, operated at the minimum costs so glibly quoted, has had enormous sums spent upon its systematic development, so that the ore can be cheaply mined, and it is equipped with stamp-mills of such tremendous size that a maximum crushing capacity is obtained; this, combined with, in most cases, a complete and expensive equipment for supplying motive power, permits of the treatment of the ore at a record-breaking figure. The expenditures incurred on installations at surface and the development underground are no longer included in the working costs, but they represent an investment of capital on which interest must be paid. It is obvious, therefore, that the yield per ton must be such as will not only meet the daily outlay in operations, but it must, during the life of the mine, redeem the initial capital spent on equipment, and it must, sooner or later, also repay the price of the property itself. Therefore the decisive factor is the tonnage available, and in low grade mines this requirement is extremely exacting, as is fully and clearly recognized on the Rand.

To speak of minimum costs on mines which are unproved, where mere assays and prospects take the place of large reserves actually measurable, is to deceive or to play the fool, and either is injurious to sane business.

DIRECTORS' DUTIES.

A recent incident in connection with the directorate of the Associated Northern Blocks, Limited, is an excellent example of how directors of London companies travel away from their real duties. This company is an offshoot of the Associated Gold Mines of West Australia, and until a month ago the various speculators who formed the directorate dwelt together, apparently at least, in unity. Suddenly, however, the shareholders were electrified by the summary ejection of Mr. Landau from the chairmanship, by the action of the other directors, Messrs. Doolette, Waddington and Tetley, who combined together to remove him from his position. It so happens that the articles of association of the company contain a very unusual clause that allows the removal of a chairman by the united vote of his confreres without the necessity of giving any reason, or of taking the shareholders into their confidence. To add to the complications, Mr. Landau declares he does not know why the onslaught has been made against him. Presumably the quarrel arose from a wrangle as to who should have the first use, for market purposes, of the cables that come over from the mine; but it is not with the origin so much as the results, material and moral, that we are concerned. The interests of shareholders are the last things to be considered by such directors, who use their position solely for their own benefit. Even Mr. Landau states publicly that the only reason he accepts a directorship is to protect the interests of himself and his friends. Not a word does he say about wishing to direct the real business of the company. His reasons for joining a board are identical, though expressed in different language, with those of his opponents, who are supposed to assume the position for speculative purposes of their own.

As we have remarked over and over again, the position of a director of a mining company in London is an anomalous one. There are certainly some mining companies where the directors really direct, and refrain from speculation. In other cases the directors only have nominal power, and are elected solely to comply with the usual custom, the actual direction and management being in the hands of an individual or a firm of mine managers. Such directors join for many reasons; sometimes to provide themselves with a little genteel employment; sometimes to represent the interests of groups of shareholders or of the managers. There are other cases where the directors join merely to receive first news and profit by it. This class may be divided into two sections: First, those who join casually without any intimate knowledge of the mine itself, and second, those who are virtually controllers of the operations both at the mine and in the market. This latter section covers the case of the Associated Northern Blocks. Their method of conducting affairs has always been characteristic of the West Australian market in London, and in spite of reforms in two or three cases, it still exercises a baleful influence on West Australian mining, and prevents the public generally from taking an active interest in the market.

To suggest a remedy is not so easy as to diagnose the disease. It is useless to call upon shareholders as a body to rise in protest, for experience shows that such agitations fail from want of cohesion. Probably the reform will eventually be effected by extending the system, adopted with success in several cases during the past few years, of placing the management in the hands of firms of mining engineers and mine managers of repute, or of corporate bodies exercising the same function, who have practically the sole control of the mine and of the office. Such firms can easily prevent the leakage of information from the mine and the improper use of information by the directors and the London staff. A name for fair dealing can only be acquired gradually by such firms, but there are quite a number who have already won it, and in doing so they have contributed notably to the well-being of the mining industry.

IRON AND STEEL PRODUCTION IN GREAT BRITAIN.

The statistics of the British iron trade for the year 1902, which have been collected by the Iron Trade Association, and which have just been published, were given in detail in a recent issue. The table below shows the leading points of production. In reading it, however, it must be remembered that puddled bar, which is the only item of the class the statistics of which are included, represents only a portion—approximately two-thirds—of the wrought iron manufactured. The figures are as follows, in long tons:

	1901.	1902.	Changes.	Per ct.
Pig iron	7,851,830	8,517,693	I. 665,863	8.5
Puddled bar	974,385	988,278	I. 13,883	1.4
Bessemer steel	1,606,253	1,825,779	I. 219,526	13.7
Open-hearth steel	3,290,791	3,083,288	D. 207,503	6.3

The condition of the British trade in 1902 was very much more satisfactory than in the preceding year. The year 1901 was a period of depression, owing partly to a decrease in the home demand for iron and steel, and still more to the crisis in Russia, Germany and other European countries. The British

trade depends largely upon export, and last year there was an important revival in the foreign demand. In part, this was due to improved conditions abroad, and in part also to the fact that the United States, absorbed in its own huge home demand, practically withdrew from foreign markets, while it also purchased a very considerable quantity of British iron. The trade showed greater steadiness, with fewer variations in prices, than for a number of years past. It presented, however, one anomaly, and that is a decline in prices of finished iron and steel, accompanied by an advance in the average selling value of pig. Manufacturers also found prices higher for iron ores and coke, and these were not offset by a small reduction in the rate of wages for labor. The various branches of manufacture in which iron and steel were used were generally prosperous, with the exception of the shipbuilding business, which forms a very important section of the British trade; in this business there was less work than for several years past. To some extent, however, this was offset by the heavy demand for rails and other railroad material for export.

The extent to which foreign business affects the British trade is shown by the fact that while Great Britain last year exported about 11 per cent of its total make of pig iron, the proportion of the finished iron and steel sold abroad was over 35 per cent. The total exports for 1902 are estimated as equivalent to 4,660,000 tons of pig iron; of which, however, only 1,103,000 tons were exported in the form of pig, the remainder being in the various kinds of finished iron and steel. The home consumption of all classes of iron, reduced to terms of pig iron, is estimated at 5,328,000 tons, of which about 1,200,000 tons were used in shipbuilding, 1,108,000 tons as general merchant iron and steel, 1,000,000 tons for castings, 700,000 tons in machinery, 450,000 tons in railroad material, and an equal amount in tools and hardware, 220,000 tons in tinplate, and 200,000 tons for naval and military purposes.

The blast furnaces in Great Britain used last year a total of 19,865,000 tons of iron ore, of which 6,439,000 tons were imported and 13,426,000 tons mined in the country. The imported ore, however, represents a larger proportion of the pig iron produced than these figures would indicate, since the ore from abroad is generally of higher tenor in iron than that mined at home. Over 80 per cent of the ore imported was from Spain, upon which British ironmasters have long depended. No other country can compare with this, Greece, which comes next, supplying only about 5 per cent, Algeria a little over 3 per cent and Sweden and Norway something more than 2 per cent. Some ore—91,000 tons—was brought from Newfoundland, but the bulk of the imports was from European countries.

Of the pig iron made, as the figures given elsewhere show, not less than 44 per cent was forge and foundry iron, which are not separated in the returns. This reminds us that Great Britain is the one of the leading countries which has adhered longest to the puddling process, and that it still produces a higher proportion of wrought iron than any other country. Steel continues, however, to make inroads on the wrought iron manufactured, although it has not succeeded in replacing puddled iron, especially in the important item of plates, notwithstanding its greater cheapness and certainty of manufacture.

As we have noted in previous years, the open-hearth process is preferred to the converter; and years ago the output of open-hearth steel exceeded that of bessemer. Last year, although converter steel represented all the increase in make, out of the total production of 4,849,000 tons of steel, 64 per cent was open-hearth and 36 per cent bessemer metal. The greater portion of both kinds of steel is made by the acid process, only about 13 per cent of the open-hearth and 35 per cent of the converter metal being made by the basic process; moreover, the basic metal shows rather a slow increase.

The number of converters and steel furnaces shows very little change, the new ones constructed having been mainly to replace older apparatus worn out. Very much the same thing may be said of the blast furnaces—the new blast furnaces mainly replace old ones. They generally show some increase in capacity, but less than in this country, for the British ironmaker has never favored the very large furnaces, such as are found at the later works in this country.

MARKET CONDITIONS.

August 12.

The passing of a possible crisis in Wall Street and the somewhat better conditions prevailing in financial circles have resulted in some improvement. The actual situation is, of course, very little changed, but there is a more confident feeling.

In copper no large business has been done and transactions have been mainly at the lowest figure. There has been more buying, however, though generally in small lots. It is again noticed that most orders of this class are coupled with a request for immediate delivery, indicating that consumers are in urgent need of the material. Apart from sentiment, the copper market remains in unchanged position; production is about stationary, and there are no large unsold stocks anywhere. Orders from Europe are better and foreign consumers are evidently buying more freely.

There is little change in the position of tin, and fluctuations have been within moderate limits. Spot tin still commands a premium over futures.

Lead remains unchanged, with about the usual business transacting. Deliveries are improving, although there is still complaint about delay in shipments.

Several dispatches have appeared in the daily press stating that the deal for the purchase of nearly all the Coeur d'Alene silver-lead mines had been completed. This, however, is hardly the case. Options on a number of the properties have been secured by Mr. Sweeny, of Spokane, who has been promoting the consolidation, but the matter has not yet been finally closed, so far as the actual situation can be ascertained. At least one large company is understood to be holding out. Mr. Rockefeller is interested in the consolidation to some extent, and his smelting works at Monte Cristo, in Washington, will be owned by the combination, if it is completed.

Spelter continues very strong, with a good demand for the metal. Supplies are somewhat better, but shipments are not promptly made. The railroads recently placed an embargo on ore shipments from Joplin to the smelters at Iola, Kansas, giving as a reason that cars were not promptly unloaded. This was removed, however, after a few days, and shipments are now going as usual.

Silver has been quiet and rather strong, with no material change in prices. Demand from the East keeps up fairly well. The Treasury Department has taken this week two lots, 125,000 oz. in all, for Philippine coinage, at prices averaging about 55.25 cents, delivered at San Francisco Mint.

The iron trade, so far as crude material is concerned, shows more activity than for some time past. There have been a number of transactions in pig iron and steel billets at the lower range of prices which has now been fairly accepted by producers. Not much of this business, however, is for fourth-quarter delivery, most of it consisting in small orders to meet the immediate necessities of consumers. There is now no difficulty in securing such deliveries as are wanted. For large orders, buyers seem to be still holding back, with the hope that still further concessions may be secured. Finished material is quiet, although the number of small orders has increased somewhat. Furnaces and mills are beginning to dread a renewal of last year's railroad congestion and many complaints are made of slow deliveries of ore and fuel.

The Western coal markets, so far as local demand is concerned, are quiet. The buying for winter stocks in Chicago and the territory west to the Mississippi is about over, and the demand for anthracite has decreased. In bituminous, local stocks and supplies are generally good; but in the lake trade deliveries have been very slow, and shippers are complaining that they cannot get cargoes for their vessels at the Lake Erie ports as fast as they are needed. At the Upper Lake ports there is also a good deal of complaint because the coal accumulates on the docks faster than the railroads can take it away. The shipments to the Northwest have been very large this season, but more is still needed. In the Pittsburg district and in the Connellsville region much complaint is made about short car supply and delay in moving trains. The Pittsburg river mines have also been running short time on account of difficulties in shipping. West Virginia mines, however, are making no complaint.

The seaboard bituminous trade continues very quiet. Car-supply troubles producers of the higher grades, who report a better demand for coal than those of the lower grades. There seems little prospect of immediate improvement in the market.

The anthracite trade, though calling for a heavy tonnage, is less active than it has been, and is likely to grow duller in the next few weeks. There is an over-supply of steam sizes, and prices on these are lower, though large quantities are going into storage.

METALLICS.

Culled from all sources. Our readers are invited to assist this department by sending similar material.

The amount of consolation afforded for years past to the miner by the introduction of the terms "rusty," "refractory" and "rebellious" to describe gold difficult to save by milling methods, has been beyond measure.

Hydraulic mines have paid with a yield of only 3 cents or 1½ grains of gold per ton, that is, the collection of 3 parts of gold in 15,680,000 parts of rock has been rendered profitable.

The gold of the Mt. Morgan mine, in Queensland, as obtained from the surface ores, was remarkable in being alloyed with only a minute trace of silver. It assayed 997 fine, the rest being copper, with a trace of iron.

Mr. William Skey, analyst to the Geological Survey of New Zealand, found that numerous samples of gold from the Thames district, although they were bright and clean, refused to amalgamate on any part of their neutral surfaces, though taken direct from the reef and untouched by hand, because native sulphur was present on such surfaces.

The action of sulphuretted hydrogen upon gold in rendering it non-amalgamable when placed in contact with mercury was demonstrated by Skey. Such gold requires to be abraded before it will amalgamate.

DISCUSSION.

Readers are invited to use this department for the discussion of questions arising in technical practice or suggested by articles appearing in the ENGINEERING AND MINING JOURNAL.

ORDER OF DROP OF STAMPS.

The Editor:

Sir.—The following data on the much-debated question of the proper order of drop of stamps in a battery may be of service and elicit the experience of others. The comparison which I shall discuss is between 1, 4, 2, 5, 3 and 1, 5, 2, 4, 3.

The mill is of 20 heads, provided with double-discharge mortars. Each stamp complete weighs 850 lb. and the order of drop was 1, 4, 2, 5, 3, running at 100 drops per minute. With a 6-in. drop and 7-in. discharge the average crushing for one month was 63 tons per day, and in each mortar stamp No. 5, counting from counter-shaft pulley, was always choked and very frequently the whole mortar also. Ten heads were hung up and the order changed to 1, 5, 2, 4, 3; then the other heads were changed and the average jumped to 81 tons per day; there was no choking under No. 5 nor under No. 1, and not once for four months has a mortar choked. For the month of June, running 94 drops (short of water), the average was 77 tons per day.

Nos. 1 and 5 take ½ in. to ¾ in. more drop than 2, 3 and 4 stems.

Being a case of the same mill, same power, same quality of ore, in fact all conditions being the same, and crushing 18 tons more per day, seems good evidence for 1, 5, 2, 4, 3. I may also state that the mill has now run 11 months, without a stem breaking, a boss or shoe coming off, and with the wooden guides very little worn. It may seem extraordinary that not one shoe has come off, and I think the cause lies in the fact that through a mistake of the manufacturers the bosses we received had ½-in. taper in 5 ins., and the shoe-necks ¼-in. taper in 5 ins.; the necks were turned to fit the bosses and put on with six thicknesses of sacking, and they take some very heavy sledging to remove when worn out.

C. S. RICHARDSON.

Caethe, Brazil, July 12, 1903.

ORE TREATMENT AT KALGOORLIE.

The Editor:

Sir.—In your issue of July 11 Mr. Philip Argall contributes some valuable discussion regarding the Diehl process as relating to Cripple Creek ores. As Mr. Argall's information regarding the progress of metallurgical practice at Kalgoorlie seems to be three years behind, and therefore his basis of argument wholly erroneous, I trespass upon your space to give some recent and detailed costs. Aside from other matters, I think I can show to Mr. Argall that he is wholly unwarranted in believing that the roasting processes must ultimately prevail at Kalgoorlie. Much progress has been made in both processes at that place and Mr. Argall's figures, which were taken in the early stages of sulphide treatment, do great injustice to both methods.

I think I can do no better than to give the detailed costs in the Lake View mill, choosing that one because it is treating an ore of similar character and a tonnage more comparable to the tonnages handled by the large roasting plants at Kalgoorlie. The Lake View mill, however, will not ultimately be the best advocate of the wet milling bromo-cyanide method, for it is an adapted plant with a stamp-mill of bad design and construction for a basis, and the accessory plant is not arranged to best advantage. Moreover the power plant on this mine (now under construction) is the worst on the field. Yet, even with these handicaps, the results are far different from those upon which Mr. Argall, probably for lack of more recent data, has formed his judgment.

I have taken the month of March as an average period, because, since that time, experiments with a 50-ton daily plant of another process have been in progress and have been charged into costs, somewhat confusing issues; the costs given, however, are a fair average. I have reduced all tonnages and costs mentioned in this communication from the long ton to the short ton, so as to be on the footing of American practice.

During the month a varying portion of a 70-stamp mill treated 8,444 tons with a duty of 5.191 tons per stamp per day. The costs include superintendence, etc., but not depreciation. Water does not include boiler-feed, which is included in power. The costs of milling and concentrating 8,444 tons were, per ton:

Milling—	
Salaries and wages	$0.0997
Water	0.0257
Supplies	0.0417
Maintenance	0.1500
Power	0.3514
Assaying	0.0037
Total milling	$0.6722
Concentrating—	
Salaries and wages	$0.0896
Water	0.0257
Supplies	0.0028
Maintenance	0.0208
Power	0.0404
Assaying	0.0019
Total concentrating	$0.1812
Total, per ton milled	$0.8534

The costs of treatment of 7,962 tons of tailings were as follows, per ton:

Salaries and wages	$0.5040
Potassium cyanide	0.4514
Bromo-cyanide	0.4277
Lime	0.0322
Zinc shavings	0.0119
Sulphuric acid	0.0090
Other supplies	0.0793
Water	0.0271
Maintenance	0.1610
Power	0.5274
Assaying	0.0405
Total, per ton of tailings	$2.2715

The costs of roasting and cyaniding 482 tons of concentrates were as follows, per ton:

Roasting—	Per Ton.
Salaries and wages	$0.9497
Fuel	0.3157
Supplies	0.0368
Transport and drying of ore	0.4050
Maintenance	0.0443
Power	0.2354
Assaying	0.0847
Total	$2.0716
Cyaniding—	
Salaries and wages	$0.5391
Potassium cyanide	0.6763
Sulphuric acid	0.0193
Lime	0.0114
Zinc shavings	0.0314
Water	0.0859
Other supplies	0.1809
Maintenance	0.3593
Power	0.6029
Assaying	0.1428
Total	$2.6493
Total cost, per ton of concentrates	$4.7209

Combining these statements of cost, and reducing all the averages to the basis of tons milled, we obtain the following results:

Milling and concentrating	$0.8534
Treatment of tailings	2.1422
Roasting and cyaniding concentrates	0.2699
Total cost per ton milled	$3.2655
Royalty	0.1069
Total cost	$3.3724

The yield was about $14 per ton, the extraction 92 per cent, and of this 65 per cent was secured from the concentrates and therefore did not pay royalty. The defective arrangement and construction of the mill and power plant resulted in a cost for power and maintenance alone in excess of these costs on the Oroya Brownhill of 38.5c. per ton, although the latter treats but 4,000 tons per month, so it must be obvious that a well constructed plant on the Lake View would work at a cost of under $3 per ton. The Ivanhoe plant, now in course of alteration to treat 12 000 tons per month, will work for not over $2.75, probably $2.50. The Oroya Brownhill mill is now in course of enlargement and alteration, and when complete, although treating the most difficult ore on the field, should show also good results. However, the figure of $3 above is sufficient to show the erroneousness of the figures of $7.86 in one instance and $5.77 plus royalty in another, as quoted by Mr. Argall for the Diehl costs.

Lack of equally recent and detailed data from the larger roasting mills at Kalgoorlie renders comparison of costs difficult. The annual report of the Great Boulder for 1902 shows the costs on that mine to be $5 per ton, but this has been somewhat reduced since, I believe. The Great Boulder Perseverance, treating about 12,500 short tons per month, gives the latest results, with the largest tonnage on the field, at $3.65; but what items are included I do not know.

The wet-milling bromo-cyaniding method requires about 20 per cent less power than the dry-milling roasting method, and involves less cost of maintenance, and also involves not over 70 per cent of the first cost, and therefore less depreciation; and above all it avoids drying the ore and roasting 94 per cent of it. These economies are accomplished practically at the extra expense of concentration, bromo-cyanide and royalty. The use of bromo-cyanide partly replaces potassium cyanide otherwise required and altogether on the Lake View these special items involve about 70c. per ton. On the other hand a dry crushing mill of the same tonnage, treating Lake View ore for extra drying, extra power, extra roasting, extra cyanide and extra wear and tear would involve fully $2 per ton.

There is nothing very novel in the Diehl process beyond the well understood methods of stamp-milling, concentrating and cyanide treatment of gold ores, except the grinding of the entire tailings to slimes and the addition of bromo-cyanide. The rationale of the process makes much towards economy and steady improvement. The royalties expire in another four years, but aside from this I think I have shown that there is no prospect of displacing the process in that region in favor of dry crushing and roasting, especially as the comparative extraction seems to favor the wet method.

Many details of Mr. Argall's understanding of Kalgoorlie practice are altered by present practice, more especially the fact that the dry-crushing roasting mills grind all ore to slimes for filter-press treatment, instead of treating a portion by percolation as he states. The wet-crushing mills do not return roasted concentrates to the battery. Kalgoorlie metallurgists do not have the same apparent aversion to filter-press treatment of tailings as Mr. Argall. The economy of percolation of sands over agitation and filter-press of slimes for a period of six months on the Ivanhoe is but 40c. per ton, besides the cost of grinding, of which a portion would disappear in the greater economy of filter-pressing if the whole product were so handled. The compensating advantage, in extraction by fine grinding, considerably more than makes up this difference in either process.

As to the relative merits of the two processes, as applied to Cripple Creek conditions, I am not sufficiently informed as to the character of the ore to offer a judgment, having only been on that ground for a few days; but I might point out that power costs at Cripple Creek are not 15 per cent of that at the Lake View mine, that the cost of water would be almost nil, the cost of cyanide and other supplies less, and that the treatment of concentrates would be much more economical. These four items would permit treating Lake View ore under Cripple Creek conditions with a well constructed mill of, say, 8,500 tons capacity, for not over $2 per ton. A point worthy of consideration by Cripple Creek operators is the adaptability of this process for erection on the mines themselves, and therefore the avoidance of freight charges and customs mill profits and especially the possibility of modifying the practice to take advantage of some of the more favorable characteristics of Cripple Creek ores, as compared to those of Kalgoolie.*

H. C. HOOVER.

London, July 29, 1903.

*In a former article on the subject Lake View costs were given, including transport to the mill; in this statement for comparative purposes they have been omitted. It is especially pointed out again that the above costs are upon a short-ton basis.

GOLD MINING ACCOUNTS.

The Editor:

Sir.—In your issue of July 11, Mr. H. C. Hoover, at your request, opens for discussion the subject of gold mining accounts. Being associated with the management of a number of very prosperous mines in various parts of the world, Mr. Hoover speaks with the authority of one in a position to know and one who appreciates the value of uniformity in the treatment of expenditures of capital and of revenue and in the keeping of mining costs accounts.

In the business of mining, custom has not yet established a uniform method of charging expenditures for development or for the extension, renewal and maintenance of machinery, plant and equipment. Owing to the varying conditions under which most mining ventures are financed and managed from the head office—leaving the varying conditions at the mine out of the question—it is doubtful if uniformity in these particulars can or ever will be attained. But it is possible, and quite within the province of the profession, to urge a consistent degree of uniformity in the practice of stating, if not of keeping, mine working costs. The suggestion that a commission of the technical societies be appointed to take up this work ought to meet with favor.

Discussion of the feature suggested as to "how far expenditure for dissection of costs is warranted by results to be attained and with how much detail it can be done within the realm of accuracy" might lead to a more general discussion of the whole subject of cost keeping.

The results to be attained, or in other words, the benefits realized by a frequent, regular and systematic dissection of working costs, are commonly acknowledged. Economies are accomplished, and a material reduction of mining costs is effected in the saving of time, energy and money. It is possible to secure specific and detailed information of the costs of work at the time of and during its progress. A better opportunity is afforded for making a critical discrimination between capital and revenue expenditures, as the legitimate operating expenses are written off each month. And the manager, depending with full confidence upon his monthly cost-sheet, is relieved of a mass of detail and his mind is free and clear for directing current operations and planning for the future. But probably the most important result, and not so generally understood, is the thorough industrial organization promoted by the conserving influence of a system of cost keeping. A department for finding costs must be supported by the various operating departments. Regular written reports—the cement of commercial organization—are required from foremen, time-keepers and others, from which are secured the data for recording, segregating and distributing the expenditures for labor. Reports and records from the stores department maintain a systematic and complete control over the distribution of supplies. In this way responsibility is fixed, co-operation is secured, the active interest of every employee is enlisted, and a criterion of efficiency established. Upon the theory that the person who lacks enthusiasm in himself can never arouse it in others, this effectual inter-staff collaboration is preserved in the knowledge that the manager is personally interested in and carefully scrutinizes each month's statement of costs. And the best of it is that by virtue of this same organization, of which cost finding is but a detail, these results and benefits are secured at practically no expense whatever. That is to say, a comprehensive system of cost-keeping may be established and maintained at no increase of expense for clerical assistance or otherwise. For the work as it comes into the accounting department can be so methodized that the regular staff usually employed at the mine office can easily handle it. As to how elaborate a proper dissection of costs can be made, it can be asserted with reasonable assurance that the development of a system of cost-finding need depend only upon the amount of detailed information that can be used by the management. The actual operation of a practical system of mine accounting in effective service at the War Eagle and Center Star mines, of Rossland, B. C., has proved this. And the same experience has demonstrated that such a system can be perfected and conducted which will exhibit in accurate detail, from ink to interest, the segregation of expenditures for labor, supplies and indirect expenses, and their determinate allocation to each and every stope, drift or other heading, separately in which work is in progress.

This experience and this statement relative to the expenditure necessary to carry out an effectual system of cost-keeping is submitted in the hope that, with the edge taken off the question of expense, a more general discussion of other and more important phases of the subject will follow.

CHARLES V. JENKINS.

Rossland, B. C., August 1, 1903.

MINE SAMPLING.

To the Editor:

Sir.—In your issue of July 4, 1903, Mr. Parker gives an example of the very indifferent results given by rolling and quartering samples on canvas sheets.

Every one, of course, admits that quartering samples on a canvas is not the most reliable way of obtaining perfectly accurate results. Still, away from railroads, where one is obliged to pack for days, riffles not being made as a rule substantial enough to stand rough handling, nothing is left to the engineer but the use of a canvas sheet which can be replaced anywhere when necessary.

In the case cited by Mr. Parker, and where he found such difference between his two ultimate quarterings as to render the results useless, I hardly think that it was due to concentration on the canvas, but that the cause lay with the nature of the sample itself. Mr. Parker states that the ore was a quartzose schist, "slightly wet and a little sticky." Naturally if the sample carried fine metallics which were set free by the partial crushing, these particles as a matter of course would be picked up by the larger "wet and sticky pieces" of the samples, which pieces acted in fact as clay does in a sluice. Under such conditions a fair sample can hardly be expected. As stated above, we all recognize that canvas quartering is far from being accurate, but still very close checking can be done with it.

The example given further on, although not at first intended to check canvas results, will, however, give an idea of how close results can be obtained by using ordinary precautions.

The following samples were taken from a quartz vein, ribboned in structure; the quartz was middling hard and carried small amounts of sulphides of iron, zinc, lead and copper. Three mill-runs of twelve hours each gave respectively 80 to 83.34 and 87 per cent of the gold values on the plates, consequently the ore can almost be called free milling, notwithstanding the small amount of sulphides present. The samples weighed originally 30 to 60 or 70 lb., according to width of vein, and after being thoroughly dried they were crushed by hand to about quarter-inch size, and then thoroughly rolled and quartered down on a large piece of canvas, the owner of the mine securing the two rejected quarters of the sample.

The samples were assayed in Denver by a well known and reliable assayer and gave the results below, or an average of gold 2.333 foot-ounces, and silver 8.45 foot-ounces. Later I received the results from the mine owner, as giving an average gold 2.42 foot-ounces, and silver 10.4 foot-ounces.

	Mine Owners' Samples.		Engineer's Samples.	
No.	Ag. oz.	Au. oz.	Ag. oz.	Au. oz.
1	5.60	0.87	4.13	0.87
2	13.70	1.16	12.00	1.00
3	3.26	0.44	1.33	0.40
4	17.38	1.31	16.00	1.28
5	6.12	4.52	3.72	5.08
6	3.80	1.74	2.00	1.40
7	5.48	0.64	4.00	0.56
8	13.12	7.58	12.40	8.00
9	16.42	1.07	15.00	0.88
10	6.61	1.04	2.47	0.93
11	8.05	5.78	3.42	4.48
12	4.17	0.35	3.00	0.39
13	7.52	1.32	4.20	1.20
14	15.60	1.45	17.00	1.26

The difference in the gold average of the two sets of samples is 4 per cent, which is close enough for all practical purposes; but the difference in silver of 19 per cent is rather large. However, taking into consideration that the assays from the mine owner were made away from any railroad, in Mexico, where supplies are not always standard, and also taking into consideration that his interest in the matter might have made him perhaps rather partial to the mine, the above results show that pretty accurate work can be done on the canvas sheet, when one is obliged by circumstances to use it. Ordinary care should be taken, samples should naturally be well dried and broken to about quarter-inch size, then carefully rolled so as to obtain a perfect mixture; if the mass slides instead of rolling on the canvas the ultimate quarters will be spotted, as a concentration in that case occurs; after each quartering the sheet should be thoroughly brushed with a stiff broom and close checking of the quarter's assays will invariably follow.

G. M. GOUYARD.

Denver, Colo., July 27, 1903.

LAKE SUPERIOR MINING INSTITUTE.

The following circular from the secretary's office gives particulars of the ninth annual meeting to be held on the Marquette Range, August 18, 19 and 20:

The Nelson House has been designated as headquarters for the party while in Ishpeming, and members are requested to assemble there upon arrival of trains and secure badges and sleeping car accommodations for the excursion to the Sault. The first excursion will leave Ishpeming at 10:30 o'clock Tuesday morning for the Maas mine, at Negaunee. Tuesday afternoon will be spent at the mines in Ishpeming. The first business session will be held at the opera house in the evening. Wednesday morning the party will leave for Marquette and Munising, leaving the latter place in the evening and arriving at the Sault Thursday morning, where the day will be spent visiting the various points of interest. Returning, they will arrive at Ishpeming Friday morning in time to meet outgoing trains. The final business session will be held at Munising Thursday evening. Itinerary of the trip, with local time cards and other necessary information, will be furnished members upon arrival at Ishpeming.

The following is a partial list of papers to be presented during the meeting:

"Sinking and Equipping No. 9 Shaft, Ashland Mine," by H. F. Ellard, Ironwood.

"A Card System for Mine Supply Accounts," by F. W. Denton, Atlantic Mine.

"Titaniferous Iron Ores," by Dr. Nelson P. Hulst, Duluth.

"Iron Ore Deposits of Arctic Lapland," by Chase S. Osborn, Sault Ste. Marie.

"High Explosives, Their Safe and Economical Methods of Handling," by J. H. Karkeet, Iron Mountain.

"A New Changing House at the Cliffs Shaft Mine, Ishpeming," by John S. Mennie, Ishpeming.

"Materials Other Than Wood for Shaft Linings," by Prof. F. W. Sperr, Houghton.

"The Champion Mill Intake Tunnel," by F. W. O'Neil, Painesdale, Mich.

"Mine Accounting," by Walter M. Jeffery.

The titles to several papers have not been received up to date.

LITHIUM MINERALS IN 1902.—The United States Geological Survey has in the press the report of Dr. Joseph Hyde Pratt on the production of lithium minerals in 1902, which amounted to 1,870 tons, valued at $38,750 at the railroad. As far as can be ascertained, the greater part of the lithium minerals mined during 1902 has not been shipped. There is an increase in the demand for these minerals from foreign chemical manufacturers.

Over a third of the lithium salts used in the United States are imported, and in 1902 these imports amounted to 21,216 lbs., valued at $22,951, or a little over $1 per pound.

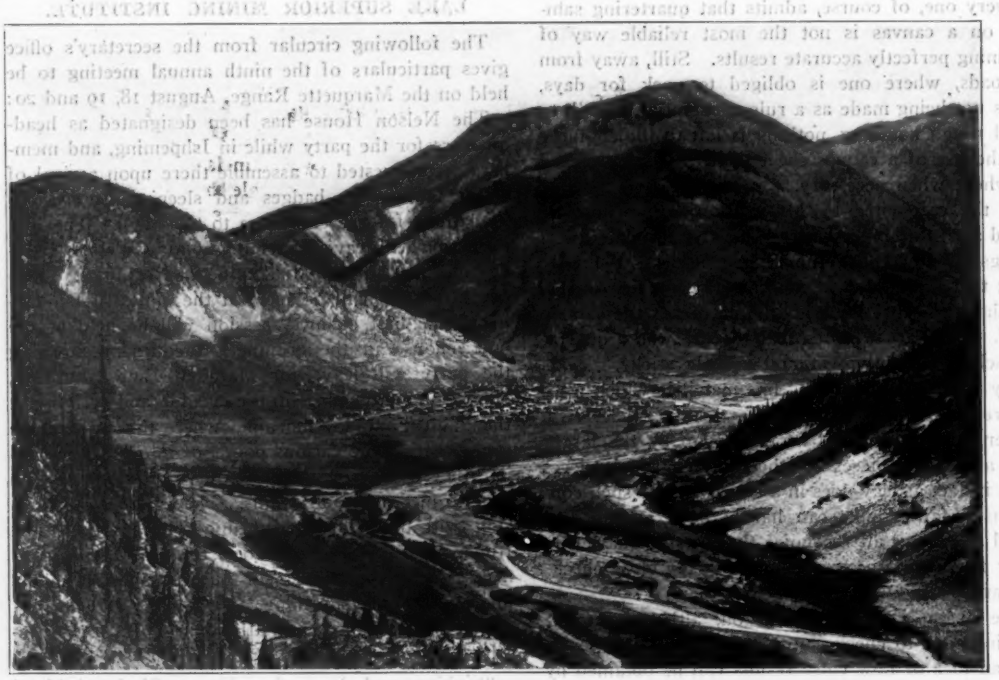
ACROSS THE SAN JUAN MOUNTAINS.

By T. A. Rickard.

(*Continued from page 155.*)

We found Silverton in a bustling condition of activity; the country tributary to it, up and down the Animas and along its numerous tributary streams, has recently undergone a good deal of that new development which is essential to the maintenance of production in a mining district. In fact, by reason of the energetic development, particularly of gold mines, which has been going on ever since the fall in the price of silver in 1893, the surrounding region is today one of the most prosperous mining tracts within the Rocky Mountain area.

The mountains around Silverton were first invaded by the pioneers in 1871, when the Little Giant vein was discovered by Miles T. Johnson. In 1872 an arrastra was put up, not far from the present site of the large modern plant of the Silver Lake mine. At that time the nearest trading station was at Conejos, in the San Luis valley. Until 1873 the Indians had legal control over the region, but this was ended peaceably by the Brunot treaty.



SILVERTON, COLORADO.

Early on the morning of September 9 our party of four rode down the wide main street en route for the Golden Fleece mine, near Lake City, about 40 miles distant. Just outside the town one passes the entrance to Cement Creek. Here there is a new pyritic smelter which is close to the site of the old Green smelter, erected by Judge Green, of Cedar Rapids, Ia., in 1874. The machinery for that early metallurgical establishment came on burro-back from Colorado Springs, over 300 miles, Colorado Springs being at that time the terminus of the railway. The first furnace was made of sandstone without any lining and Mr. John A. Porter has told me of the advantages and disadvantages of this method of construction. It had one advantage: when the siliceous portion of the charge was insufficient for a good mixture the side of the furnace contributed the silica which was wanting! In 1876 the first water-jacket used in Colorado was put into service at the Green smelter; it was a round jacket three feet in diameter and was made by Fraser & Chalmers, at Chicago. The year before, 1875, Mr. Porter had put in a syphon-tap, suggested by his experience at Eureka, Nevada, from which place he had come to Silverton. This was the second syphon-tap employed in Colorado; the first was put in at the Swansea works, near Denver, by Ahrents. Nothing remains of the old Green smelter save a cabin with a brick chimney, which used to be the assay-office of the establishment. This plant was the parent of the San Juan Smelting Works at Durango, erected in 1880, and contributed an important share to the early development of the surrounding region.

Local smelters such as these have helped the exploration of the mountains. In riding across country, as we were doing, one would occasionally see, in contrast to the bright coloring of the aspens, a black patch of ground, suggestive of the gloomy gulf down which Pluto snatched the fair Persephone. These dark patches are old slag-dumps, which have crumbled to dust, and serve as reminders of the little smelters which preceded the large centralized establishments erected in later years at Pueblo and Denver. The memory of these early efforts has crumbled away, like their slags, but they are interesting not only as small beginnings of a great industry but on account of their human associations. They served to train many of our best men. John A. Porter has been mentioned in connection with the Green smelter; at the Rico works, first built under the name of the Grand View smelter; in 1879, such men as F. M. Endlich, Hofman and Arnold successively got experience and, in much later years, W. C. Brace, E. J. Wilson and L. D. Godshall. The early seventies in Colorado saw the beginnings of many reputations which are now well established. Dr. Edward D. Peters is said to have been a great champion of the reverberatory in those days; he built a smelter at Dudley, at the foot of Mt. Bross, in 1872. The ores were rich in silver and copper, but loaded with heavy spar, so that although he began with only a calcining and stone blast-burnace, 36 by 42 in. in section, with water-cooled tuyeres, he subsequently added a reverberatory furnace, having a 9½ x 15 ft. hearth, which was fired with spruce wood. The ores were unfit for smelting by themselves, but the smelter was operated with moderate success for two years. At that time West was in difficulties with a matte blast-furnace at Black Hawk and Collom was bucking against the impossible zinc-silver ores of Georgetown at a little smelter just below Empire, near the forks of Clear Creek.

Col. William L. Chandler was at Saints John, in Summit County, just over the continental divide, where the ore from the mine at Keystone was made into a silicate of lead in the fusion hearth of a roasting reverberatory furnace. This was called "matte" and was treated in a low shaft furnace; the height from the tuyeres to the charging door being 5 ft. This stuff was sent to Empire, where John Collom was running the small shaft furnace already mentioned. The treatment was a failure until H. A. Vezin took charge of the works and produced good silver-lead. This was early in 1872 and was the first lead produced on a commercial scale on the Atlantic slope of Colorado. In 1875 Anton Eilers took charge at Saints John, but left in a short time in order to join Billings at the Germania works at Sandy, near Salt Lake City. He was succeeded at Saints John by Franz Fohr, who, in later years, was manager of the Harrison Reduction works at Leadville.

In 1874 Mather & Geist established their works at Pueblo with two furnaces. This was the beginning of the Pueblo Smelting & Refining Company. A certain Prof. Cheney at Animas Forks and a Prof. Durier at Animas City started smelting furnaces in localities as ill situated for fuel as for ore—doomed therefore to point a moral and adorn a melancholy tale.

Richard Pearce had his first experience, in Colorado, in 1873, at an unsuccessful smelter erected near Empire, on the site of Cullom's old works. At the end of 1873 this ill-fated establishment closed and Mr. Pearce moved to Black-Hawk, where Prof. N. P. Hill, not long arrived from Brown University, was in trouble with the pyritic ores of Gilpin County. Pearce and Hill joined forces and, under the advice of the former, an addition was made to the plant, whereby it became possible to treat the matte, which up to that time had been shipped to Vivian & Sons, at Swansea, Wales. This change of method made the Black-Hawk smelter a financial success, and led finally, in 1878, to the erection of the large plant at Argo, near Denver, where, under the name of the Boston & Colorado Smelting Company, it has since become so well known.

Jas. B. Grant was recently graduated from Freiberg when, in 1878, he built a small one-stock smelter at Leadville. Within a year this was increased to eight stacks and in 1880 Edward Eddy and W. H. James, who owned sampling works at Leadville, joined Mr. Grant in his smelting venture. That pioneer establishment is gone, but it was the parent of the Omaha & Grant Smelting & Refining Company. Anton Eilers has been referred to already. He was at the Germania plant from 1876 to 1879; in the spring of 1879 he started grading for the Arkansas Valley smelter, which was blown in on May 20, of that year.

In these early efforts there is a personal equation and a human interest lacking in the larger undertakings of later days because they represent the skill, hopefulness and energy of individual young men, many of whom have proved to be masters of the metallurgical art. While it must be amusing to those who are accustomed to the more patient progress of older countries to read of a period within the memory of active men as being "historical," yet, as time is measured in a rapidly progressive mining region like Colorado, it does indeed seem long ago. "In a remote period of Western history, that is to say, 30 years since," is a sentence not without a touch of humorous exaggeration to a European, but the rapid achievement of a new country outsteps the slow beat of a pendulum.

(*To be Continued.*)

PRODUCTION OF ASBESTOS.—The production of asbestos in the United States in 1902, according to the report of Dr. Joseph Hyde Pratt to the United States Geological Survey, was 1,005 short tons, valued at $16,200, chiefly from the mines at Sall Mountain, White County, Georgia. The production of asbestos in the United States has never been over 1,200 tons per annum, and when these figures are compared with the amount of asbestos imported, which is almost entirely of the chrysotile variety, it will be appreciated how large is the demand for this variety. The total value of the imports of asbestos in 1902 was $762,432, as compared with $691,828 in 1901, with $355,951 in 1900, and with $312,068 in 1899—an increase of over 100 per cent in the four years. Nearly all the asbestos imported into the United States is obtained from the Province of Quebec, Canada.

ORIGIN OF THE ORISKANY LIMONITES.

By J. E. JOHNSON, JR.

In the discussion of the genesis of ore deposits (precipitated by the publication of Prof. Posepny's famous paper bearing that title), which has gathered interest with the passage of the years, a notable feature has been a tendency to pass over occurrences of the ores of the commoner metals and the simpler forms of ore deposits and to attack at once the more difficult problems presented by the rare, especially the precious metals. That these problems are complex and difficult is abundantly proved by the descriptions of the deposits themselves and even more by the profound differences of opinion as to their origin existing among eminent geologists.

It is in the hope that the light cast by a simple problem may assist in the solution of the more difficult, as in other sciences, that the present article is written.

The general facts in regard to the occurrence of the Oriskany brown ores are so well known that it might seem hardly worth while to state them here except that observations of a number of such deposits in the light of literally "working" knowledge has seemed to make clear one or two points which those able to do so have never taken the trouble to fully explain, while courage to express opinions as to the origin of these deposits is partly contributed by the recent visit of a distinguished mining engineer and geologist who insisted upon an origin and circumstance of occurrence so unnecessary and, as regards the latter, so at variance with the observed facts that a brief statement of these seemed less superfluous than it might have been otherwise.

The writer begs leave to say in his own behalf that he is in no sense a geologist and is by training a chemical engineer who was forced by circumstances into mine surveying as a part of his work in the first place, later into executive charge of the mines, and in order to contend with bad superintendence, was eventually compelled to make himself thoroughly familiar with every part of the work and conditions in them. No one, therefore, need expect anything more than a record of facts and observations taken principally from the Virginia brown ore fields, especially those of the mountain counties in which the brown ore occurs in a blanket or "reef," as it might be called, lying in a definite relation with the other strata; as contrasted with those deposits in which these ores occur as pockets in the Trenton limestone.

It is to the former that the name Oriskany is applied, because they occur in the place of, or immediately under, the Oriskany sandstone, the "No. 7" of the Rodgers system.

The structural conditions surrounding these deposits vary so widely within a few miles that the selection of a type is hardly possible. They occur at intervals more or less widely separated in all the ranges between the Blue Ridge and the summit of the Alleghanies, but more frequently and in larger deposits toward the center of the chain lying between the Great Valley and the summit of the Atlantic watershed, and principally to the southwest of the divide separating the Potomac and James rivers. Alleghany County, Virginia, is the center of the district.

The most noteworthy fact about the region, geologically, is the entire absence of any evidence of volcanic activity, past or present, with the possible exception of a few quiet, warm sulphurous springs scattered over one small district.

There are faults, presumably, but they are not large or numerous; the writer does not know of one of geological importance in the district.

The structure, as a whole, consists entirely of anticlinal mountains with synclinal valleys between them, the mountains being not exactly on one long continuous axis even when they appear so from quite a close view, but being *en echelon*, with their axes all approximately parallel and running N. 35° E. The whole structure is so regular as to suggest the waves approaching a gradually sloping beach. There are, of course, spurs at right angles to the principal mountains, but these are mere ridges, in some cases produced by erosion, in others the stratification partially follows their contour in such a way as to show that they have been produced in part by cross-folding; but this is not generally observable, the tops of the principal mountains being noticeable for their straightness and the slight degree of lateral folding of the surface strata. The tops of the mountains are almost always of the No. 4 or medium sandstone, while the country rock of the entire region in the valleys is the No. 8 slate or Devonian shale, which immediately overlies the Oriskany sandstone.

In relation to the anticlines it should be stated that in many cases their sides have been forced up vertically and in some have been carried past this point so that the anticline is partially lying on its side, though its continuity with the syncline of the adjacent valley is preserved by a very abrupt bend in the strata at, or near, the bottom of the mountain. This structure is shown with the greatest clearness at a number of the gaps through the mountains. The side which is thrust over is generally the northwest side of the mountain. Whether this has any connection with the fact that on the northwest side lies the great plateau of West Virginia, the writer is not geologist enough to say.

The iron ore is found at the point where the Oriskany sandstone outcrops on the mountain-side, and it would be between this and the Helderberg limestone, which immediately underlies the former stratum, were it not for the fact that where there is an outcrop of ore there is never any outcrop of limestone, though the limestone itself very frequently outcrops where there is no ore, but the writer does not know a single instance in which these two outcrop one above the other; at greater depths the limestone is frequently encountered as the footwall of the ore deposit, but this does not usually happen until the bottom of the ore deposit at that point is nearly reached.

The customary footwall of the deposits is chert, sometimes massive, but much more frequently in lumps up to the size of a man's head; these are generally contained in a matrix of yellow clay, while sometimes there is a great thickness of clay and but little chert. The hanging wall is extremely variable, consisting sometimes of solid sandstone many feet in thickness and sometimes of a blue clay or altered slate, with a layer of a few inches of ore called locally the "hanging vein." At the deeper levels siderite is occasionally found; sometimes in place of the ore and sometimes in the blue clay "hanging."

The Oriskany sandstone is, it will be seen from the above, not infrequently absent in some deposits, while in others it is the most prominent feature. The dip of the deposits and their depth vary through the widest limits. In one case the ore was continuous over the whole syncline from one outcrop to the other, but this is very rare; the total depth of the deposit from the bottom of the syncline to the outcrop must have been 500 or 600 ft. In another case, the ore goes down absolutely vertically for 500 ft., but as far as can be seen, it does not follow the syncline under the valley. This deposit, vertical at its southeast end, twists gradually in the half mile or more of its length to a slope of only about 30° or even less, there being many irregularities in the length of the twist, which is, nevertheless, very clearly marked throughout.

The thickness of the Oriskany sandstone, even when not associated with any ore, is most variable throughout this district, ranging from nothing to 40 or 50 ft.; when it is present as the "cap rock" of the ore, the portion next the ore is heavily impregnated with iron, becoming less so as the distance from the ore increases, until it finally becomes ordinary white sandstone. The impregnation is sometimes so great that the independent miner wishes to persuade the furnace man to accept it as ore; but without success, unless the needs of the latter are great.

It is a noticeable fact that where the sandstone occurs in contact with the ore the latter penetrates the former in such a way as to simulate a breccia, the sandstone occurring in cubical blocks with ore in the interstices or cracks between them.

The variations among the different deposits in the minor circumstances of occurrence are as great as those described of the more important ones, and it would be an endless task to enumerate them, even if any one person had the intimate knowledge of all the mines in the district to permit of it.

The thickness of the black slate is generally stated to be about 800 ft., but where it overlies the ore, even at a long distance below the outcrop or in the bottom of the valley, it is never more than the half of this (so far as known to the writer), and generally about a third.

The current explanation of the occurrence of these ores has been that the ground-water leached the ore out of the slate and subsequently dropped it and dissolved the sandstone on its downward course. As to the slate being the source of the ore, there is probably no reason to doubt it. The writer recently had a sample of this slate, taken where it was free from dirt and showing a good brownish black color, analyzed, and it gave 2½ per cent of iron.

If the iron ore ran 50 per cent and was twice as dense as the slate, a bed of the latter 200 ft. thick, at this rate, would yield a bed of ore 10 ft. thick, if completely leached out. Considering that the black slate is supposed to have been a continuous sheet over the whole district at one time, and having regard to the amount of it eroded away, the wonder is that the ore deposits are not larger. As to the second part of the current theory, it is not borne out by the facts and is capable of being supplanted by one which is inherently more likely, namely:

That the water charged with carbonic acid, which dissolved the oxide of iron in the first place, carried the iron until it came to the Helderberg limestone, and immediately deposited the ore in order to dissolve the stone, the latter being of course very soluble in water containing carbonic acid, while oxide of iron is much less soluble in such a solution. This brought the ore immediately under the sandstone, which, as far as its permeability would allow, acted like a sponge and absorbed as much of the iron oxide as it could hold. As the process went on, the top edge, so to speak, of the limestone was continually dissolved away, leaving its insoluble contents behind. As this stone contains considerable quantities of chert and, like all other limestones, is more or less associated with clay, these being insoluble, gradually settled to the lower side of the limestone bed, where their support was no longer dissolved from under them. At the same time the ore continued to be deposited at the top surface of the limestone; as that was continually receding the bed thickened until it came upon the immovable chert and clay, which accordingly became the footwall of the deposit.

The action on the hanging wall side, however, was less definite in its results because of the great variation in the thickness of the Oriskany sandstone and in the quantity of ore deposited. If the conditions for the deposit of ore were favorable and the sandstone thin, the sandstone began by acting as a matrix for the ore and absorbing it, but as time went on and the quantity of ore increased, it ended by being absorbed into the latter.

If the conditions for the deposition of ore were good and the sandstone was thick, its face in contact with the ore absorbed all it could, especially in those minute cracks (which were perhaps the result of bending so hard a stratum), with the resulting checkerboard appearance, but as the distance from the ore increased the sandstone was able to obtain less and less of it and finally the outer portion of the sandstone remained untouched.

If the sandstone was heavy and the conditions for the deposition of ore poor or absent, the result is a sandstone ferruginous on the face next the limestone; but decreasingly so as the distance from it increases. These represent the typical conditions which occur; every gradation between and combination of these may be seen in the infinite variety which seems to be typical of geological phenomena.

The occurrence of siderite (iron carbonate) at the lower levels is interesting as showing that the iron is almost certainly carried in solution in this slate; but the reason that it is not deposited as limonite at the lower as well as the upper levels is not clear. This feature is not common enough to be of importance. Many confirmations of the correctness of the explanation given for the *modus operandi* of the leaching part of the processes are to be had. One of the strongest is the deposition in the workings of a soft hydrated oxide of iron, which would only need to be hardened to be the same as that in the veins. These deposits are not infrequently made by springs running into the various entries through the slate, in which case the carbonic acid which enabled the ferric oxide to be dissolved escaped with the atmosphere instead of dissolving limestone and carrying it away, but the effect, as far as the deposition of the iron ore is concerned, is the same.

Chalybeate springs in which the same action takes place are not infrequent, and in these the bubbles of carbonic acid escaping are very much in evidence, as is the ore deposited. It has been thought by some that these ores were deposited previous to the formation of the mountains in which they are found; but all the evidence indicates that the surface waters deposited them after the uplift was completed. This is proved by the fact that while some of the deposits go several hundred feet below the outcrop, as already mentioned, these are the exceptions rather than the rule, and many indications of ore on the surface have been investigated which die out at slight depths, and under the central portions of large areas of the back slate no ore has ever been found, and it may be taken as established that deposits of ore are only found under circumstances favorable to the action of large quantities of surface water on the upturned and broken edges of (originally) great masses of black slate at points where the conditions favored the passage of the waters through the slate into the limestone.

Four facts may be cited in proof of this statement which are also in some degree guides (chiefly in a negative way) in the examination of properties for this ore.

1st. No great body of ore has ever been discovered in a small mountain or hill. Many large mountains exist in which no ore of any considerable amount exists and many small deposits have been found in small mountains or even ridges, but the general statement holds.

2nd. No large body of ore extending to any depth under the surface has ever been located where the dip is reversed, that is, where the strata dip into the mountain instead of with it.

3rd. No large body of ore has ever been located where its upper edge did not lie fairly well up on the slope of a regular syncline.

4th. No large body of ore has ever been located where the mountain is divided longitudinally by a ravine or valley so that upper edges of the black slate is on the opposite side of the dividing valley from the main body of the mountain.

The connection between these criteria and the conditions stated above as necessary for the deposition of ore are self-evident, though there are undoubtedly others; for there are many points at which the criteria are fulfilled and yet no ore deposits exist; these latter are, unfortunately, not so clear and are not known to the writer, but of those given it may be said that they are founded on observation and a fairly wide knowledge of the district in question.

There is one fact in connection with deposition of ores by surface waters which is not infrequently overlooked and the neglect of which has strengthened the hands of those gentlemen who seem to believe that everything (except possibly fossil remains) was ejected from the molten interior of the earth either in a fused state or in solution in waters derived from this interior. This fact is the vastly greater amount of surface water in past geologic times in consequence of the enormous rainfall of those times. Lyell's uniformitarian theory was essentially a protest against the series of cataclysms postulated by the older geologists; it is doubtful if he ever meant to imply that geological action had never gone on any faster than it does now, and the idea that this is the case cannot be accepted for a moment. A consideration of the rainfall in mountain regious adjacent to the tropics as compared with that in the temperate zone will be sufficient to demonstrate this, amounting, as it does, to form five to ten times as much. When we reflect that in the Carboniferous age, for instance, the temperature as a maximum was, very possibly, almost that of boiling water and the amount of land relative to that of water was much less than at present, it is not difficult to believe that the circulation of water which went on was hundreds of times more active than that existing to-day. Add to this the enormous quantity of carbonic acid then present in the atmosphere, to be carried down by these rains, and the phenomena of ore deposition of this kind cease to be the inexplicable puzzles that they otherwise seem; they may become the keys to the solution of more difficult problems.

A HOPEFUL VIEW OF MINING CONDITIONS ON THE RAND.

We have published a good deal concerning the labor difficulties and the slow progress, generally due to the inadequate labor supply, on the Rand; therefore it is a pleasure to quote the following extract from the speech of Mr. Max Francke, who presided at the annual meeting of A. Goerz & Co., one of the leading financial corporations of South Africa:

"Once the labor question is solved—and solved it must and will be without much further delay—we have the brightest of hopes as to the future of our industry. Already the results of British administration are making themselves felt, and we anticipate even greater benefit in the future. I should like to emphasize the improvement in conditions which is already in sight. Take the case of explosives. Formerly 12½ per cent. of the total working expenses of the mines of our group represented the cost of explosives. The price of blasting gelatine before the war was 97s. 6d. per case of 50 lb. At present it is bought at 67s. 6d. per case, and, large as the reduction between the two prices is, we are in sight of a still further reduction, because we are now offered this compound from several quarters at prices varying from 51s. to 55s. per case. Taking the old average working costs of our mines at 25s. per ton milled, 3s. per ton of this represented the cost of explosives, which will now be obtained at a price of 1s. 8d. per ton milled, showing a direct saving on this one item alone of 1s. 4d. per ton, or an increase in profits of about 10 per cent. Then as regards coal, railway sidings have been constructed, or will be constructed, in the case of a large number of gold mines, enabling fuel to be delivered in bulk direct into the bunkers at the mines, instead of being delivered by the expensive bagging system heretofore used. The result is a saving of 3s. per ton of coal. As coal represents about 8 per cent of our working costs, or 2s. per ton milled, this saving of expense means a further economy of, say, 4d. per ton milled. Parenthetically I may here mention that cyanide also has been reduced in price from 11d. or 1s. per lb. (European price) to 7½d., and this means another saving of 2d. per ton milled. Further, the present strict administration of the law in regard to the sale of intoxicating liquors to natives means a very real benefit to the industry, though it is somewhat difficult to put the saving into figures. Formerly, some 20 per cent. of the natives employed at the mines were incapacitated by drink or illness, mainly the former. Now about 95 per cent of the natives employed are available for work, and, in the case of the May Consolidated last year, the proportion was even as high as 98 per cent. As the natives have to be fed at the cost of the mines during their periods of incapacity, the new state of affairs means a saving in expense as well as considerably greater efficiency. Then, 22 per cent. of the working costs of our mines is due to expenditure on fuel, mine timber, iron, tools, steel, and other stores. The considerable reductions in railway rates made at the beginning of this year, and the further reductions to be made in a month or two, will directly benefit our mines in connection with these items. On the other hand, we have to allow for the 10 per cent tax on mining profits, this tax comparing with the 5 per cent profit tax levied before the war, although for so brief a period that it was hardly felt. The 10 per cent, which has been variously estimated to be equal to between 1s. and 1s. 6d. per ton, represents the limit of direct taxation to be imposed on the mines, and it is evident from the present very satisfactory condition of the colony's finances that, provided a solution be found for the labor problem, so far from the authorities needing to put on further taxes they may be able to add to the remissions of taxation already carried out or decided upon The decrease in the working costs to which I have already referred is mainly due to the change in the government of this country, but altogether apart from these particular reductions we can expect the cost of working to become less. In 1898-99 the working expenses of the mines on the Rand generally were as much as 8s. per ton lower than in 1892-93, and 4s. per ton lower than in 1895-96. In other words, the reduction was rather more than 1s. per annum. The percentage of the total yield paid out in dividends before the war rose from 20 per cent in 1892-93 to 23 per cent in 1895-96 and to 31 per cent in 1898-99. There is, of course, every reason for assuming that the steady decrease in working costs witnessed before the war will be seen again as soon as the industry gets again into a normal position."

THE SLOW-DROP STAMP-MILL.

A great deal has been said for and against the long slow-drop and deep discharge of the stamp-mills in the little district of Gilpin County, Colorado. The latest expression of opinion is that of Mr. Geo. E. Collins.[1]

"A little study and a good deal of practice has confirmed the writer in the conviction that, as might indeed be expected, the methods which long experience has evolved in Gilpin County are the best available. Whenever a product of good shipping grade can be made, by selective breaking of ore-streaks underground or even by a moderate amount of handsorting at surface, it is wise to do so: in many cases, if this is well done, there is very little value left in the milling ore. The degree to which it is advisable varies with the district, being at its minimum in the case of the Hidden Treasure and adjacent mines on Quartz Hill, and at its maximum perhaps with some of those in the lower part of Russell Gulch, where, in some cases, milling ore of fair assay is worthless. As to milling methods, the larger proportion of ore is best suited to the regular Gilpin County slow-drop mill. Other ores give better results by coarse concentration, the jig-tailings being re-crushed and amalgamated in the slow-drop mill; by simple concentration without amalgamation; and by amalgamation stamp-milling with medium drop and discharge. But there is certainly a considerable remnant of ores which are too poor to stand the cost of smelting and freight charges, but are unsuited to either method of milling. The writer has painful recollection of a mine which he himself worked, the ore from which, whilst of fair grade, say 0.30 to 0.50 ounce gold, could not be effectively sorted, and was successively run in an amalgamating stamp-mill, where it yielded a very small amount of gold and of worthless concentrates; and in a concentration mill where it gave a somewhat larger quantity of low-grade concentrates, and no gold, and where the concentrates in one case actually assayed less than the waste. The usual resource in such cases in Gilpin County would be to vilify the millman; but even this offered no prospect of consolation, as the writer had to shoulder the responsibility both as miner and millman."

[1]Abstracted from "The Relative Distribution of Gold and Silver Values in the Ores of Gilpin Co., Colorado," *Proceedings* of the Institution of Mining and Metallurgy, July, 1903.

GOLD MINING AND MILLING IN ECUADOR.

By J. W. MERCER.

This paper is placed before the mining profession in the hope that the facts determined in our operations may be of some service to others.

The Zaruma gold mines are situated in the district of Zaruma, province of El Oro, Republic of Ecuador, South America, in latitude 3° 45′ south, in the west Cordilleras of the Andes, at an elevation of 3,000 ft., and about 60 miles southeast of the city of Guayaquil. The mines are reached from Guayaquil by small river steamer to Santa Rosa, and thence by mule 45 miles.

The little village of Zaruma is a Spanish town

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of 1,000, the buildings being of *adobe* walls and tile roofs, while the streets are narrow and paved with cobble stones. Indeed, many pieces of "lively" appearing quartz may be seen serving as pavement. The town was founded in the middle of the sixteenth century by some of the Spaniards, who had been engaged in conquering the country. It is at the head-waters of the river Tumbez, which empties into the Pacific at the old town of Tumbez, where Francisco Pizarro and his band of gold seekers landed when they began to conquer and destroy the wonderful Inca. The old stone-paved road built by the Incas to connect the city of Cuzco, in Peru, with Quito, in Ecuador, passes near Zaruma.

The extent of the mineral region is not fully determined. It extends for several miles north and south, and contains numerous gold-bearing veins in andesite. The Spaniards worked the mines from the middle of the sixteenth century to less than one hundred years ago. The old workings now open are sufficient to prove very extensive operations at one time. It seems that at first they worked the soft and broken veins and surface gravels as placers; later came the *arrastra* and stone mill. The latter consists of an oblong boulder containing two sockets which serve as a mortar, while a stone shoe is fitted into a wooden boss and stem. They were worked either by hand or overshot water-wheel. Many of these old mortars and shoes may still be seen, partly covered by soil.

I have examined at least twenty old Spanish mines, some of which extend to a depth of more than 100 ft. The Spaniards selected the soft streaks of the veins and did not mine below the oxidized zone. The mining system employed was that of small pillars and chambers with inclined steps for entrance and exit. The only metal tool found in the old mines is a hand bar of soft iron; most of the old workings are now inaccessible.

After the Spaniards, a French company operated for a time in the district, and then in 1878 came an English company, which worked quite extensively with a light-weight stamp-mill; but apparently they could not satisfactorily treat the ores and discontinued operations in 1893. In 1897, the South American Development Company of New York began developing, and is still operating.

In Ecuador a mining claim is 200 by 600 meters and must pay an annual government tax of about $5 each year, in advance. No patent or deed is given, the claim being held by possession and the payment of the tax. The law states that the taxes shall be expended upon the construction of a road between the mines and the coast. Mining supplies are free of import duties and the output is free of export duties.

The veins make a very interesting study, showing various stages of alteration. In some formations there may be seen clean blue-white quartz, the highly silicified and altered fragments and "horses" of wall-rock in the vein, walls of partially mineralized andesite, and the pure andesite country-rock a short distance from the vein. Most of the wall-rock contains pyrite, while the "horses" are often heavily impregnated with it. The veins are of two types, one with well-defined partings, the other with tight frozen walls, where it is difficult to determine the line between vein and country. There is one large fault-vein with course north and south and dip of about 70° easterly, which may be traced several thousand meters along the surface. From the northeast, many quartz veins come into this, but none have, as yet, been traced on its westerly side. Most of these latter veins have a course east of north with southeasterly dip. The veins of the district usually range in width from one to six meters. The ore-shoots generally pitch north.

The most common ore is a blue-white quartz containing 10 to 12 per cent of sulphides—galena, pyrite, chalcopyrite and blende. The values are mostly in gold, which seldom appears visible, but probably occurs as free gold in the quartz and sulphides. Close concentration tests would indicate that about 50 per cent of the gold value in the ore is in the sulphides. Oxidation rapidly occurs when the ore is exposed to the atmosphere. The wall-rock usually carries small values.

The following is an analysis of one type of the ore:

	Per cent.
Silica	56.57
Lead	1.98
Copper	0.51
Iron	4.90
Alumina	3.10
Zinc	8.25
Calcium oxide	8.20
Magnesium oxide	0.16
Sulphur	8.35
Total	92.12
Undetermined	7.88
Total	100.00

Three methods of taking out the ore are employed. Where the veins are wide and the walls loose, the stopes are filled from surface; if in such veins surface filling is not possible for lack of raises, pillars are left until connection with surface is made. Where the veins are narrow or the walls firm, the underhand method is employed and the stope left open.

The filling method used is one not very common. First, a raise is begun in the center of the ore-body or center of the block of ground to be mined and is put through the surface. At each end of this block a timbered chute is carried up as the ore is taken out. Ore is mined in the form of a pyramid with the surface raise at its summit. After filling the sides of the pyramid are planked so that the ore next mined will slide by gravity to the chutes at either end. Thus it may be carried on by mining and filling to the surface. Our largest stop opened in this manner is 100 meters in length. Every effort is made to avoid the use of timber, because of the scarcity of the first class article. That which is most easily available rots in a few years in underground service. Of course, this method requires a lateral working drift which taps the ore-body by cross-cuts at the end chutes and in the center if desired, thus making it possible to fill the entire space made by the vein.

It is very important to put all possible work on contract or piece work. The natives are learning to be fair miners and drill-men. At first Americans were tried, but they do very little more than the natives. Underground wages are about $1 per meter of hole drilled, which makes it possible for the very best miners to earn $1.50 to $2 per day, American gold equivalent.

Milling.—The milling consists of amalgamation followed by cyanidation. The mill contains 40 stamps, 850 lb. each, which run about 95 drops

per minute, crushing through 20-mesh screen; outside amalgamation only is employed. Each battery is equipped with three copper plates 5 ft. long with riffle-box at the foot of the first two. After amalgamation, the entire pulp, without sizing or concentration, goes to the cyanide plant. With such an ore (10 to 12 per cent concentrates) the plates become easily dirty and stained, but are dressed frequently, while we aim to keep the surface in a pasty condition, allowing no free quicksilver to appear. The amount of "quick" used is about 1¼ oz. for very troy ounce of gold obtained. The amalgam is about half bullion and half quicksilver, and is worth in the neighborhood of $6 per ounce. The bullion is from 650 to 670 fine.

The average extraction by amalgamation for the

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first three months of 1903 is 38 per cent of the gold in the ore. All power is from water, and the cost of milling per ton is about 50c. Hard amalgam forms rapidly on the copper plates and can be taken off only by the use of chisels or by sweating over the fire.

Cyanidation.—The unoxidized ores from the deep parts of the mine yield to treatment much better than those near the surface. In all this work, silver is not considered, it being a very small part of the value. All the tailings from the copper plates of the stamp-mill are sent to the cyanide plant without concentrating or sizing. Undoubtedly classification, concentration and re-grinding of the coarse material would permit of better cyanide extraction, but the plant is not at present arranged for this.

The plant consists of four rubber dams with distributors and slime gates; eight 5 x 30 ft. steel vats, having burlap and canvas filter-cloths; eleven sets of zinc-boxes, each containing nine or ten compartments of 3.7 cubic feet; sump, storage tanks, pumps, etc.

The method of treatment is as follows: The pulp from the stamp-mill passes through the distributors and into the stone dams, where the water and slimes are drawn off. While the slimes amount to 18 per cent of the weight they are of a lower grade than the sand, being some 10 per cent in value. As soon as thoroughly drained, the sand is wheeled in barrows by native laborers, to the vats, 30 ft. away. Solutions are put on rapidly and percolate in about six hours; then the charge is allowed an air bath. Solutions are kept alkaline by about 0.3 lb. of caustic soda per ton of sand; lime is preferred, but there is none available. After treatment, the tailings are sluiced out by hose through side-discharge gates. Sampling is done by means of an auger. Zinc shavings are used entirely. The dust was tried, but not only did it result in a poor extraction and low value product, but also caused a much larger consumption of zinc.

The ores as they come from the stamp-mill, without concentration or sizing, contain from 10 to 12 per cent in sulphides of iron, copper, lead and zinc. The proportion of copper is about 0.33 per cent. In the surface oxidized ore, it is often in the form of native copper which plays havoc with extraction and cyanide consumption, but from the deep part of the mine, it is in the form of chalcopyrite and does less damage.

In very many points the treatment is contradictory to common cyanide usage.

When the writer began experimenting here, the sand samples were being taken with a tester, as is often recommended in the cyanide books. The clean-up of the zinc-boxes was made at the end of the month, and notwithstanding the fact that the difference between the heads and tails of the ore indicated an extraction of 50 per cent, little came from the boxes; in fact, for a time their yield was but 10 per cent of the gold value. This discrepancy caused much annoyance and a great deal of investigation. It was found to be due to several reasons. In the treatment of the material there was, of course, some concentration at the bottom of the vat. This wet material would not cling to the tester, and consequently the bulk of the sample came from the upper part of the charge, which was lower in value than the average. Further, the zinc-boxes were doing very poor extraction, sending half the values back onto the charges. It often occurred that the tailings of the sands thus taken were higher than the heads. A large auger was made for sampling and the zinc-box method changed until it became possible to check closely all through. The experiences of others were studied and various methods tried without success; those common on the Rand, in California, Colorado, Mexico, etc. Tests were continuously made in the laboratory, in a small one-ton plant and in the large vats. Solutions of all grades were tried from the high down to 0.03 per cent, and finally, instead of using one ton of solution of 0.30, we have come to the use of three tons of 0.065 per cent of ton ore. We give no soak and no wash; scatter the soda throughout the sands while loading in the leaching vats, following each charge of 30 to 50 tons of solution by from six to twelve hours standing in the air. The extraction of the gold is now from 60 to 70 per cent. The zinc-boxes are extracting 99 per cent of the solution values; the clean-up checks very closely with expectations.

In 1902 the yield was within $200 of what the zinc-box theoretical extraction called for.

Most interesting of all the complex treatment is, perhaps, the action in the zinc-boxes. Each set has nine or ten compartments of 3.7 cubic feet capacity. The speed of flow is kept below one ton per hour each set. The product for shipment comes from above the screens, not below; nothing turns to slimes and drops through the screen, except a low-grade grayish precipitate. After filling the boxes with new zinc and starting operations, the clean bright shavings first become plated with brilliant copper color; then follows a black-gray precipitate of gold which tightly cements itself on the copper-colored zinc. The zinc thus protected does not disintegrate or slime. When it has finished receiving gold, it breaks into material like coarse straw, and then must be taken out, because it has reached its highest value, while to leave it in the box but diminishes the capacity.

Many friends among cyanide experts, chemists and smeltermen wrote, "Why do you not wash through a fine screen and put the coarse back into the boxes?" Naturally, this was the first thing tried. The gold precipitate is cemented to the copper-colored zinc, while the zinc inside cannot disintegrate. A vigorous washing in water through fine screens simply results in making two grades; the finest a low value slime, and the coarse still high and of no use when put back into the boxes. Even long grinding on the bucking board reduces its value only one-half. Now, this coarse material is worth from $8 to $10, while the fines which drop through the screen are only worth from $1 to $3 per pound. The smelter called the material "hair mattress," and did not wish any more. Everybody told us to burn it down with sulphuric acid. This treatment had been tried at first, and it was found that the bulk could be reduced but one-half. Hydrochloric acid will reduce it to one-quarter its original weight, but since the cost of acids is very high, and since nothing is to be gained in freights by reducing it to

bullion, it seems best to ship the crude material. Now it is burned over a slow fire in order to oxidize the zinc and permit of easy sampling. This product is soldered in the tin-lined cyanide boxes and shipped to the smelters.

It will be seen that the zinc passes four stages: (1), Copper-plated; (2), black and wiry; (3), black-gray coarse straw; (4), gray-black muck with a large percentage of white flocculent precipitate.

In the second stage it is just beginning its best work; in the fourth it is practically dead and very low-grade on account of the accumulation of white precipitate, while in the third stage it has reached the highest values. It will be seen that to leave this material in the zinc-boxes only lessens their capacity.

Much study has been given to the operation of the boxes. It is found that if they are dressed often to keep out all finished material, so that the full capacity has active zinc, each ten compartments of 3.7 cubic feet can safely handle one ton per hour. The head solution averages about $2, the tails 2c. per ton. With ill-kept boxes and rapid flow of solutions the tailings always go up.

The cyanide practice adopted was a result of long continued experiments. While the experiences of others were carefully and eagerly studied, they availed nothing, and more than ever it has been realized that each ore needs its own method. Experiments were conducted constantly, using tests in the laboratory, tests in the small one-ton plant, and varied tests in the entire large plant for over six months, before a satisfactory treatment was found. The extraction during all that time was a gradual increase from 15 to 70 per cent.

In conclusion, the treatment now used is as follows: The sands are drained of the water and slimes, and then turned over before the addition of solutions. The solutions will not reach the gold in the sand if settled from water and treated direct. A second turning over will often yield additional extraction.

Three tons of solution, of 0.065 per cent strength, are used per ton of sand.

The solutions are kept alkaline.

Fifteen day treatment.

No soak, no wash.

Zinc-boxes about 30 cubic feet capacity for one ton per hour flow of solution; they are dressed frequently, so that only active zinc remains in them.

The consumption of supplies per ton of ore treated is: Cyanide, 3 lb.; soda, 0.3 lb.; zinc, 1 lb.

Extraction by the difference of heads and tails sampled is 65 per cent; extraction by precipitates marketed, 63 per cent.

Zinc box work shows 99 per cent extration of gold value of solutions.

Cost of treatment, $1.25 per ton.

Many cyanide operators write of difficulties in making the theoretical extraction check with the actual results. In my work, I have found this often due to incorrect sampling of the sand, before and after treatment. I found the tester very unsatisfactory, but have secured good results with an auger.

Further, the value of the precipitates shipped did not at first check closely with that indicated by the difference between heads and tails of solutions in the zinc-boxes. This was found to be caused by the method of sampling the zinc-box solutions, and also in the erroneous measurement of the quantity of solution passing. I use every means possible for keeping coarse gold and amalgam out of the cyanide plant, and treat the material as soon as possible after it leaves the stamp mill, and before any great oxidation takes place.

It is very necessary to keep a careful and full record of everything, comparing the work by means of tabulations or curve diagrams.

NEW GERMAN STEEL WORKS.—Large new steel works are being established at Aachen, Germany, by the Rothe Erde Hüttenverein. They are to be completed by April, 1905.

MANSFELD COPPER SHALE.*

In many places ore deposits are found which are characterized by the feature that the ore occurs in sedimentary rocks. The distribution in certain strata being fairly uniform over a considerable extent of surface, an impression is produced that the metallic combinations present must have been formed at the same time as the surrounding rock; and thus the opinion was long prevalent that the ore was precipitated from the same sea that deposited the strata in question. Now, with regard to the Mansfeld copper shales, it has long been known that the ores are in no wise confined to one and the same stratum of strata; and knowledge has also been acquired as to the influence, on the ore veins, of the so-called *rücken* (faults) met with in these deposits. Formerly the numerous mineralized fish remains found in the copper shale were regarded as connected with the presence of poisonous sulphates of iron and copper in the Permian sea, and the bent tails of these fishes as indicative of the convulsions produced by such poisons; and even now the opinion is still frequently expressed in many hand and text-books that the copper shale is a sedimentary formation, extending over a large portion of Germany. We, however, feel justified, on the ground of abundant observations, in asserting that the entirely opposite assumption is the only true one. The dissolved ores penetrated from the fissures into the shale and also into the sandstone strata of the Weissliegende, filling up the parting fissures of the strata, and undergoing subsequent special modifications after the impregnation was completed.

Examination of a magnified section of this ore shows clearly that the ore material (chiefly pyrites) has displaced a portion of the granules, which then appear as debris in the sand ore. The process of displacement extended from the outside of the granules to a greater or smaller degree towards the center of the inclusions; and the smallest granules are completely mineralized. The dissolved metallic salts seem to have penetrated from the faults, mainly into the fissure parting the sandstone from the shale, and from thence to have impregnated the Weissliegende. The section indicates in the clearest possible manner the origin and distribution of the ore; and this example shows how very important a proper comprehension of the origin of ore deposits is for the correct interpretation and practical utilization of the phenomena observed.

BELT ELEVATORS.

In almost all ore-milling operations one of the most useful and necessary, and at the same time the most objurgated, pieces of apparatus is the belt elevator. Yet the belt elevator, if properly designed, should not give any more trouble than more complicated machinery, which is exposed to equally hard conditions of service. The design and construction of belt elevators are frequently, however, not what they should be, and indeed authorities differ materially as to the nature of the specifications. Some advocate the perpendicular elevator, others the slanting. Some believe it to be the best practice to feed the ore directly into the buckets, others arrange the feed so that the buckets will scoop the ore from the boot. Some use a special boot, others do not. There are equally important differences of opinion as to the speed of the belt, spacing of the buckets, discharge of the ore from the head end, etc.

The continuous band for an elevator of this type will be of rubber belting, except in the case of the elevator taking the discharge from the dryer in mills wherein the ore is dried, if the latter be so hot that a rubber belt would be softened or otherwise deteriorated; in which case link belts or chains passing over sprockets must be used. In drying ore, in order to insure good screening, it has been found to be desirable not merely to drive off the moisture, but also to heat the ore to a temperature of about 250° F., since the hotter the ore the greater is the capacity of the screens, especially if the ore be of a clayey nature. There is, however, a limit to the heating of the ore, which is soon reached, if it is to be handled directly from the dryer by means of a belt elevator.

The belting for an elevator of this type should be of superior quality, not less than 6-ply in thickness for an 8-in. or 10-in. belt. Some authorities recommend that a 10-in. belt should be of 7-ply, a 12-in. belt of 9-ply, a 14-in. belt of 9 to 11-ply, and a 16-in. belt of 11 to 13-ply. Such heavy belts as those last mentioned are rarely employed, and their use is of doubtful advisability in connection with the comparatively small head and foot wheels that are commonly provided. However, it appears rational enough to increase the thickness of the belt as the width increases, since the capacity of the buckets and, consequently, the strain on the belt increase at a much greater ratio. An improvement over the ordinary belt is the special elevator belt, which is made by nearly all the manufacturers in this line, it being ordinary belting surfaced on the outer side, or on both sides, with a covering of 1-16 in. or ½ in. of pure rubber. This covering adds about 12½ cents per square foot of surface to the cost of the belt, if 1-16-in. thick, and twice as much if ⅛-in. thick. This makes a considerable increase in the first cost of the belt, and opinions differ as to whether the increased wear justifies it.

The buckets commonly employed are the deep form, referred to as "Style A," made of malleable iron. These buckets are seamless, strong and smooth, and their round corners tend to insure free delivery of the material handled. The buckets are commonly spaced on the belt, from 12 to 20 inches apart, center to center. A spacing of 18 inches is probably the best practice, and when a nearer spacing is employed it is likely to be due to the attempt to obtain too large a capacity with too small a belt. The capacity of an elevator is solely a function of the volume of the ore, the speed of the belt, the spacing of the buckets and the size of the buckets. The buckets should not be reckoned as running more than one-third full. Assuming that the buckets are running one-third full, are spaced 18 inches apart, and that the belt speed is 300 ft. per minute, the capacity of the sizes of elevator most commonly used, in terms of ore weighing 125 lb. per cubic foot, is as follows:

Width of belt.	Dimensions of buckets.	Capacity of each bucket.	Capacity of elevator in tons per hour.
12 in.	10x6x5 in.	160 cu. in.	22.5
10 in.	8x5x4 in.	108 cu. in.	15.0
8 in.	6x4x3.5 in.	50 cu. in.	7.0

The head-wheel should be of sufficient diameter to afford proper friction for the belt. It is seldom advisable to employ a head-wheel of less than 30 ins. diameter, but it is seldom necessary to exceed 36 ins. The diameter of the foot-wheel is not of so much importance, but it should not be so small as to cause thereby too sharp a curve in the belt, depending upon the thickness of the latter. A foot-wheel 20 ins. in diameter is about as small as ought ever to be used, while a 30-in. wheel is probably as large as any elevator will require. The use of a foot-wheel 24 ins. in diameter is a common practice. The smaller the pulleys the more detrimental to the belt. The belt should always be 2 ins. wider than the buckets.

The best speed for a belt elevator is about 300 ft. per minute. In order to impart that speed, the head-wheel must run at 38.2 revolutions per minute if 30 ins. in diameter and 31.8 revolutions if 36 ins. in diameter. With a belt speed of 300 ft. per minute, the centrifugal force throwing the ore out of the buckets will insure a satisfactory discharge, whether the elevator be perpendicular or sloping.

As between perpendicular and sloping elevators, the former generally adapts itself the better to the construction of the building, and permits in many cases a simpler arrangement of the machinery; it is less expensive in first cost and less expensive to keep in repair than the sloping elevator. The drawback to its use is the trouble in maintaining proper ten-

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*Abstracted for *Mineral.* January 17, 1903.

sion in the belt, as the latter stretches. This must be arranged for by the installation of a tightener, which is usually provided in the form of an adjustable boot, wherein the foot-wheel can be depressed as required. If there be insufficient room for lowering the boot, the head of the elevator may be so arranged as to be raised, but the latter expedient is seldom practiced, although it is quite convenient in case the driving belt from the line shaft has a tightener on it, or if the line shaft and the head of the elevator are at the same height and not too close together. In the case of the sloping elevator, inclined at 10° to 15° from the vertical, or more, the belt is always self-tightening, with an elastic tension, the sag on the descending side maintaining a sufficient tension, although the belt may have stretched to a considerable extent. In one case, a sloping elevator, with 10 by 6-in. buckets and a new belt, ran continuously for nine months without any shortening of the belt being required.

There is equally important difference of opinion as to the best manner of feeding the ore into the elevator. Some mill-men advocate that the chute leading into the boot should deliver the ore 16 to 18 ins. above the center line of the foot-wheel. Others recommend that it be placed sufficiently high so that there will always be one or two empty buckets directly below the one being filled. Others prefer to allow the ore to fall into the forward slope of the boot and be scooped up by the buckets as they come around. The last method saves considerable height, which is important if the foot of the elevator must be placed in a pit, as is frequently the case. With a properly designed boot there is no danger of the buckets being torn off, although the ore fed may be as coarse as 2½ ins.; if by chance a piece of ore wedges between the edge of a bucket and the boot, it is shoved upward until the increased clearance allows the bucket to pass, when the ore will slide down again, and will be taken up by the next or some following bucket. In many elevators there is no boot provided, the housing being simply extended down to the floor and allowed to fill naturally with ore, and sometimes there is not even any housing. An objection to scooping up the ore is the greater wear of the buckets, but this is offset by a greater wear on the belt when it is attempted to feed into the elevator so that the buckets will take the ore "on the fly." In order to avoid this wear of the belt, some mill-men insist that the ore shall be fed in from the side, so as not to strike the belt. The usual practice, however, is to feed directly toward the belt from the front. At the best, the ore spouted into the elevator is seldom caught entirely; there will be some that fails to be caught, which will accumulate in the boot and will still have to be scooped up.

An important feature in the design of a belt elevator is the arrangement of the discharge end, in order to insure a clean delivery of the ore. Some mill-men prescribe that the discharge chute should take off from the housing 10 ins. below the center line of the head-wheel; others prescribe 16 ins.; others measure down 27 ins. from the center of the head-wheel shaft and then draw a line at an agle of 45°, the intersection of this line with the housing of the elevator being the point at which the discharge chute takes off. The last rule makes the elevator unnecessarily high. It is the practice of some mill men to arrange the discharge chute so that a small quantity of ore will be retained at the point where the stream strikes, in order to protect the bottom of the chute from abrasion; others arrange a special casting of iron for the ore to deliver upon, which is a very good device. There is always likely to be a small quantity of ore that will fall back into the elevator, and to avoid this dropping between the belt and the foot-wheel, it has been found a useful expedient to insert a sloping partition at one or two places in the housing of the elevator, inside of the belt, so arranged as to discharge any droppings of ore into a small box outside of the housing.

In any form of belt elevator it is advisable to arrange the journals of both the head and the foot shaft so that the bearings will be as far away from exposure to dust and grit as possible. It is still better to arrange them so that a stuffing box can be inserted between the bearing and the housing of the elevator. It is one of the bad features of the adjustable take-up boxes designed for the boot by most manufacturers that the bearings are arranged so closely to the boot that it is practically impossible to protect them from grit.

The power required to operate a belt elevator is comparatively insignificant. The apparatus itself is in equilibrium, and only such power has to be applied as is necessary to lift the ore and overcome the friction. The theoretical requirement of power to lift 10 tons per hour to a height of 40 ft. is only 0.4 horsepower approximately, and allowing an equal amount for friction, the total is only 0.8 horse-power. If a horse-power costs $100 per annum, and in small plants in the West it is likely to come to about that figure, the cost of running an elevator for one year for power alone would be about $80. Assuming that this were the cost of operation for only 300 days of 20 hours each per annum, the quantity of ore elevated would be $300 \times 20 \times 10 = 60{,}000$ tons, and the cost per ton would be 0.17 cent. Allowing 0.33 cent per ton for repairs, which is a liberal estimate, the total cost of elevation would be only 0.5 cent per ton. It is evident that there cannot be much objection to the extensive use of belt elevators on the score of cost. The chief objection is the loss of time that is likely to be suffered through their breakdown. This can be reduced to the minimum by the installation of a well-designed elevator of ample capacity and the best construction in the first place, and when in operation by a careful daily inspection and the making of necessary repairs at convenient times.

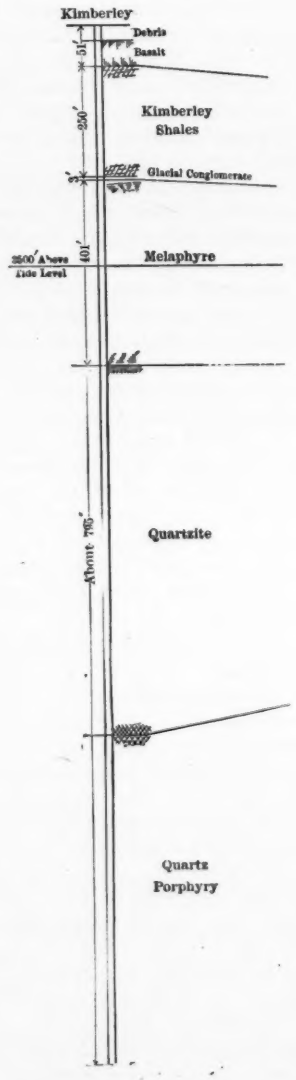
RADIUM.—If a tube containing radium bromide is wrapped in black paper and brought within 3 in. or 4 in. of the eye, in a dark room, a curious sensation of general illumination of the eye is experienced; this occurs whether the eyelid is closed or not, says Mr. F. Harrison Glew, in *Nature*. It is difficult accurately to describe the sensation produced; the eye seems filled with light. This effect can readily be detected when six florins (silver coins) are placed between the closed eye and the sample of radium. Probably the effect is due to general fluorescence of every part of the eye, for fluorescence seems to be a commoner property of matter than hitherto suspected.

EFFECT OF FINENESS OF GRAIN ON THE FUSIBILITY OF CLAY.—In a paper read at the Albany meeting of the American Institute of Mining Engineers, February, 1903, Professor Heinrich Ries described briefly the results of experiments as to the effect of the size of grains of clay as effecting the fusion point of the clay. It has been believed that aside from the percentage of fluxing impurities in a clay the size of the grains exerts an important influence, although in the case of fire clays this has been disputed by some authorities. If the clay be supposed to be composed of a mixture of very refractory grains, such as kaolinite, and some fusible ores, it is rational to expect that the more easily fusible grains will melt first on the surface and softening under heat will extend gradually from the surface of the grain to its center. Consequently the larger the size of the grain, the longer will be the time required for the heat to penetrate it. Therefore, with two kinds of clay, containing the same proportion of fluxing constituents, the one containing the smaller size grains should fuse first, because the fluxing materials are more evenly and thoroughly distributed through the clay, so that they will more or less surround the refractory ones, which tend to act as a framework and hold up the clay-mass when not. The experiments of Professor Ries tend to show that this is actually the case.

KIMBERLEY NOTES.

By T. Lane Carter.

The most important holding of the De Beers Consolidated Mines are the following diamond mines: The Premier (also called Wesselton), Dutoits-Pan, Bultfontein, Kimberley and De Beers. The Kimberley and De Beers mines are in the central part of the city of Kimberley, while the Bulfontein, Premier and Dutoits-Pan are near the suburbs of Beaconsfield, a few miles distant. According to geological theory these volcanic diamantiferous pipes have a common origin and become one at a great depth. The observer is inclined to give this conclusion some credence, after seeing the Dutoits-Pan and Bultfontein mines, which appear to be dipping toward each other.

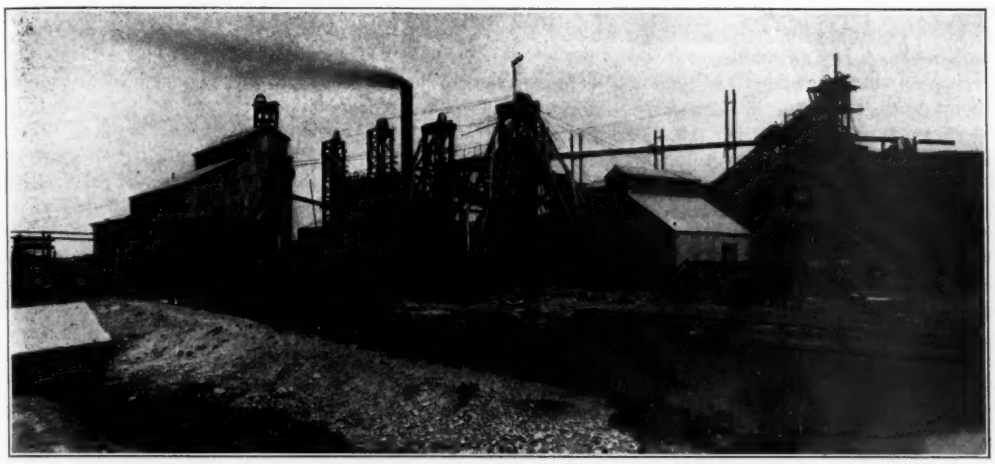


It is at least probable that these two mines come together at a great depth, and that the Kimberley and De Beers mines also have a common origin.

It is very natural that there should be much speculation at Kimberley concerning the common origin and probable depth of the deposits and the possibilities for very deep mining. Much discussion has been indulged in as to the mining at great depths on the Rand gold field, but it strikes one that the prospects for very deep mining at Kimberley are just as bright as at Johannesburg. Continuity of value with depth is the first consideration for very deep mining. This condition the diamond mines seem to be meeting, for taken on the whole there is not a pronounced falling off in value with depth. The general laws governing ore deposits do not hold for these diamantiferous craters, which are unique in geological experience. There seems no *a priori* reason why the ground at 4,000 ft. should not be as valuable as it is at 1,000 ft. It is of course evident that working expenses will be higher; the "blue ground" may become harder in depth, so that atmospheric exposure will not break it up, as it does at present.

There will not be the same necessity for rushing to very great depths at Kimberley as there is at Johannesburg. The demand for diamonds is limited, and fluctuates, and there is enough diamantiferous material at comparatively shallow depths to supply the world for years to come.

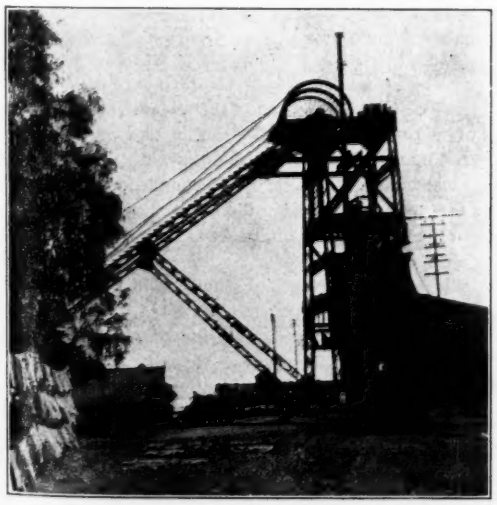
The geology of Kimberley cannot fail to interest anyone who has to do with the science. In the same area there is more variety than in the gold mines of the Rand. As is well known, the diamonds are found in old volcanic pipes, in a heterogeneous matrix which varies in color with the distance from the surface. How the diamonds were formed is too



WASHING PLANT, DE BEERS DIAMOND MINES.

big a question for incidental treatment. The country is covered with a layer of limestone about 3 or 4 ft. thick. This limestone also extends over the craters; then comes what is called "yellow ground," some 150 ft. thick, and this gradually merges into "blue ground." No one knows how far this blue ground goes down, but it is of great depth.

It must not be imagined that the material is of uniform value; some of the material, in fact, is too poor to be taken out. The Kaffirs are very quick to find out the richest sections of the mine, and are always eager to work in these sections. For every diamond they find a substantial bonus, from the Kaffir's point of view, is given them. When they are



STEEL HEAD-GEAR, DE BEERS MINE.

placed in poor sections of the mine, where diamonds are seldom found, there is much grumbling.

What is known as "hard blue" is rock which remains unaffected by the atmosphere after an exposure of a year. This "hard blue" varies in the different mines. In the Premier Mine, for instance, which is the youngest, there is practically no "hard blue," as yet. As depth is gained in this mine, no doubt it will have as much "hard blue" as the other mines.

Of the country rock surrounding the craters the third formation from surface, namely, the shales, is much affected by the atmosphere. Frequently it burns, especially in the Bultfontein mine. This, of course, tends to make the workings hot.

The line of demarkation between the old volcanoes and the country rock is easily seen. What surprises the observer is the comparatively small metamorphic effect that the volcanic rock has on the surrounding country. As a rule the dikes met with in the Transvaal have a pronounced effect on the strata in their immediate neighborhood. This lack of metamorphism seems to show that the diamantiferous material could not have been in a molten state when extruded.

The stones produced by each mine are characteristic. An expert sorter can tell almost at a glance from which mines a parcel of diamonds was obtained. Although the De Beers Consolidated turn out an enormous quantity of diamonds, they cannot boast of turning out the finest quality, for the Jagersfontein mine in the Orange River Colony produces finer gems than the Kimberley mines. The best diamonds, however, come from the Vaal River diggings.

Most of the mining now being done by De Beers Consolidated can really be described as "deep mining." The "open cut" method is still employed in the Premier and Bultfontein mines, but even there it will shortly cease.

The shafts for underground mining are sunk in the country rock a few hundred feet from the edge of the crater. It is impossible to foresee the eccentricities of these "pipes." At a depth of several hundred feet, the horizontal distance of 200 ft. from the crater at the surface to the shaft, might be reduced to nothing, and the shaft cut into diamantiferous ground. This, of course, would interfere with the entire scheme of operations. For this reason it is considered wise to allow plenty of room between the deposit and the working shaft. Although the craters are irregular, it is quite safe to say that they do not show signs of contraction on the lower levels. In some cases they are larger.

The head-gears erected by De Beers Consolidated are of steel, about 80 ft. high. This excellent practice is only partially followed by the Rand, where wooden head-gears are much too frequent. The shafts of the diamond mines have four compartments. No wooden runners are seen in these shafts, only steel being employed, as wooden runners could never stand the wear and tear of the rapid hoisting. Cornish pumps are common, but electric pumps are also made use of. Several types of hoisting engines are employed, a very striking one being the vertical Whiting hoist at the Kimberley mine. Great use is made of endless rope haulage, both underground and on the surface. The automatic arrangements for loading, tipping trucks on the haulage line, etc., are ingenious and designed with the idea of handling a great tonnage expeditiously. Although the endless rope haulage is made most use of to-day, in the future electric haulage will supplant it in many places, especially in the underground workings of the larger mines.

In this connection the central electric power station now being built is of interest. It will supply power for the mines, both for lighting and motive purposes. This station is thoroughly up to date, more so, perhaps, than any of its kind in South Africa. The steam engine, save for driving small exciters, is relegated to the past, and in its stead the steam turbine is placed. The Babcock and Wilcox boilers are provided with mechanical feeders; a mechanical draft is also used, the stock being taken some 20 ft. above the room. In the transmission 5,000 volts will be adopted for the line; the switchboard, when completed, will be the finest in South Africa. There is no wood about the whole building, a light steel framework, bricks, and corrugated iron being the materials of construction.

As is usual in South Africa, the question of water is a vital one. The amount of water produced varies on the different mines from about 8,000 gals. per hour in the Kimberley and De Beers mines to nearly 30,000 gals. per hour in the Premier Mine. Since the water is alkaline, the trouble experienced on the Rand, where it is always very acid, is unknown at Kimberley. The more water there is the more pleased they seem to be. At present De Beers Consolidated makes up its deficiencies in water supply by buying water from the water works company at the rate of 8d., or 16c., per 100 gals. The water is stored in dams, evaporation in the dry season being prevented as much as possible by dividing up the water surface by an earth wall run across the dam.

The dangers attending diamond mining are by no means as great to-day as they were in the days before the consolidation of interests. In the past, mud rushes from the huge open cuts into the underground workings were the greatest source of accidents. These mud rushes are caused by water collecting in the bottom of the open cut and uniting with the loose dirt to form mud; such accidents are rare nowadays, only one mine, namely, the De Beers,

COMPOUND AT KIMBERLEY.

THE NETTING IS TO PREVENT KAFFIRS FROM THROWING DIAMONDS OVER THE SIDES OF THE COMPOUND.

is seriously affected by them. This calamity comes with awful suddenness, either killing men outright or burying them alive in "dead ends." To give the men every chance of escape, many exits are provided; for the same reason, electric lights are placed liberally throughout the workings, for all candles would be extinguished by the air currents, if they were used as illuminants. Strange to say the Kaffirs are not unnerved by these disasters, which furnish topics of conversation for days. Either these Kaffirs have no imagination, or they are very phlegmatic.

In the Kimberly mines mud rushes are practically unknown, for the reason that every precaution has been taken to prevent them. By means of drainage tunnels the water is caught before it gets into the

open-cut, so that no mud is formed. The same scheme is being carried out in the De Beers mine, and no doubt when the drainage wells are finished such accidents will cease.

It is likely that similar precautions will be taken in the newer mines, when the time comes, for in a mine like the Premier, producing 30,000 gals. of water per hour, an enormous quantity of mud would be formed were this water to get into the open-cut. Besides being dangerous to life and limb, these mud rushes are expensive, filling up, as they do, the wells and destroying the timbering. It is economical, therefore, to spend large sums in any scheme that will prevent their occurrence.

In opening up a diamond mine the open-cut method is employed as long as possible, for it has many advantages. To prevent interference from waste rock sliding into the mine, the sides are blasted down, and the waste material hoisted out. When open-cut mining becomes impracticable the diamantiferous material is extracted by underground mining. In open-cut mining there are two systems of getting the material from the bottom of the big hole. Either an endless rope-haulage is put down on a grade of 1 ft. in 5, as in the Premier mine, or an aerial haulage is employed, as in the Bultfontein mine.

The system employed in the underground operations is ingenious, and is the best possible for the conditions. In the early days pillars of "blue" were left intact, as supports, but in the present system all the blue ground is taken out. It is a caving system, a caving in and a filling of the excavations by the waste rock above into the open cut. In many respects the system is like the one employed in Cumberland, at the iron mines. The main levels, on which mechanical endless rope-haulage is installed, are placed about 300 ft. apart, and this distance is broken by working levels, about 40 ft. apart. Use is made of the waste material in the open-cut, for when the blue is mined up far enough the weight of this material crushes in the remaining division of blue. In some cases the amount of material falling in from the sides more than makes up for the material taken out underneath, so that the open cuts do not gain in depth as mining proceeds.

Timbering is resorted to for tunnels in soft blue ground. The timbers used are two props with a cap of round timber and lagging 1½ in. thick.

The yellow ground and the soft blue ground are drilled with long "jumpers" sharpened at both ends. In this kind of material two natives working one long drill can "jump" 15 ft. a day. In the lower levels the blue is very hard in some places, and the Kaffirs cannot drill much more than the black miners in the Rand gold mines. The black drillers at the diamond mines are superior to those in the gold mines; some of them are as good as white miners.

The contract system is extensively used, both for white and black labor. The system employed differs from that on the Rand. In Kimberley a contract is given out to three men, and they are allowed to employ white men at a fixed price per shift; in the gold mines, however, a contractor is only allowed as much work as he personally can do with the help of Kaffirs. There is no sub-letting or employing men to help him. The men work on 8-hour shifts in the Kimberley mines; very little of the mining is done with machine drills, the Kaffirs putting in all the holes with the hand drill. Besides drilling, most of the other work, as timbering, tramming, etc., is done by contract.

The Kaffirs are put on piecework, and this accounts, no doubt, for their superior efficiency compared with the same class of labor in other parts of South Africa. By this scheme a Kaffir, if he works hard, can make $1.80 per day, nearly twice the pay of the black miner at Johannesburg.

The visitor is surprised to see how little work is done with rock drills. It is claimed that tunnels can be driven cheaper by hand drill than by air. Rock drills are an unfortunate necessity in the narrow reefs of the Transvaal, but one is inclined to believe that they could be used with much greater advantage at Kimberley than at Johannesburg. The stopes in the diamond mines contain practically all diamantiferous material, and no matter how much stuff the rock drill broke down it would all be valuable. If machine drills can be used in gold mining on reefs only six inches wide there is surely scope for them in stopes where there is no waste rock to break down.

The contractors are accustomed to the present method of hand labor, and it is difficult to introduce a system which they would look upon as an innovation. The air drill is used, but, as I said before, only on a small scale, as in driving drifts in the waste rock.

The efficient contractor makes good wages. He is paid by the load, a load being about 16 cu. ft. All reckoning, indeed, is in loads, no use being made of the ton. The value in diamonds is always stated as so much per load, not per ton. The contractor is as well off as he would be in Johannesburg, for the wages and salaries in Kimberley are as good as they are on the Rand. The Transvaal metropolis attracts many of the best men from the diamond mines, however. There are the advantages of a larger city and a bigger scope, with more chances, on the gold fields, compared to the diamond mines. On account of competition, wages will no doubt continue as high at Kimberley as on the Rand. The cost of living is lower than at Johannesburg.

One is impressed by the insignificant part that chemistry plays in the great industry at Kimberley. Without the help of chemistry the gold industry of the Rand would come to a standstill. At Kimberley there are no assay offices, no assay plants, no analytical laboratories, no chemical processes. The extraction of the diamond is a purely mechanical process. Unfortunately, there is no assay for diamonds. It is known exactly how much gold is thrown away in discarded residues, but in diamond mining there is no way of telling how much the tailings are worth after treatment. If the mechanical process of washing is not carried out properly there is no way of proving it.

At the present time an old residue dump is being washed again for diamonds, and a good profit is being made from this material, thrown away years ago. This stuff runs from 20 to 25 carats per 100 loads, and is worth about 5s., or $1.20, per load. It is possible to handle this waste dump very cheaply. Some day other old heaps will probably be rewashed for diamonds.

The reader is, no doubt, acquainted with the fact that the diamantiferous material mined to-day at Kimberley does not get to the washing plant until a year's time. The stuff is spread out on vast tracks of specially prepared ground, called floors, so that the atmospheric agencies can crumble it. What is known as "hard blue" remains unaffected by this treatment.

In order to treat the "hard blue" which is unaffected a large mill has been erected, where all the "hard blue" of all the mines is sent for treatment. It frequently happens that diamonds are crushed by the rolls in this mill, but there is no other way of dealing with this variety of material.

A very fortunate discovery for De Beers Consolidated was the fact that grease has a strange affinity for diamonds. The hand sorting of diamantiferous concentrates is entirely done away with now, all the diamonds being caught on the tables known as "the greasers." After scraping, the grease and diamonds are steamed together, and the residue from the grease is used as a lubricant, so that there is no loss.

A magnetic separator is also being used now, to draw from the concentrates all magnetic material before the final sorting of diamonds. The stuff that is finally handled is made up of pieces of diamagnetic material, and some stones of heavy specific gravity. Very few garnets are found in the final residues.

De Beers Consolidated has a large central workshop, where as many as 500 skilled mechanics alone are employed. Some very fine work is carried through in these shops. The cannon, "Long Cecil," famous in the siege of Kimberley, was made in this shop, and after excellent service it is to be placed on a large monument in a public square in the city of Kimberley.

The visitor is struck by the efficiency of the Kaffirs. A good deal of nonsense has been written against the system of compounding the natives at Kimberley. I have seen a good many black men in different parts of the world, but I have never seen any to surpass the Kimberley Kaffirs for hard work. A system that can produce such efficient workmen cannot be very much wrong. It is impossible for these Kaffirs to ruin themselves with intoxicating liquors, the only liquor they get being a mild drink called Kaffir beer. In case of illness the blacks have every attention and efficient medical attendance.

In some points the Kimberley compounds are superior to the compounds at Johannesburg. The rooms are larger and better ventilated, but they are built of corrugated iron, which is inferior to the material used on the gold mines, namely stone. In all the compounds on the De Beers Consolidated there are stores where the Kaffirs can purchase whatever they want. This is a different policy from the Rand. In Kimberley most of the Kaffirs buy their own provisions, whereas on the Rand food is always supplied by the companies.

There is a large head office building where the business of the corporation is carried on. As regards the keeping of cost sheets, card indexes, etc., the systems are all that could be desired and reflect much credit on those responsible for them. In fact, this huge concern is conducted in a most business-like manner. The best that money can buy is obtained, but there is no waste.

There are two survey departments, the land survey department, which has charge of all the farms, stands in Kimberley, the floors for blue ground, etc., and the mine survey department, responsible for all mine survey work. Both departments are fully up to the best practice.

Not far from Kimberley is the pretty residence suburb, Kenilworth, one of Mr. Rhodes' pet schemes.

There are few places more delightful for an engineer to visit than Kimberley, partly from the interest which diamonds excite, partly from the great display of machinery and mines, and very largely on account of the kind hospitality which the officers of De Beers Consolidated extend to the stranger within their gates.

ELECTROLYTIC DETERMINATION OF ZINC.—According to A. Holland, electrolysis of zinc in an alkaline solution in the presence of potassium cyanide permits the separation of iron and aluminum, if the proper conditions be observed. The solution of zinc and aluminum, containing not to exceed one gram of both metals, is evaporated after the addition of 2 c.c. of concentrated sulphuric acid and heated until the acid vapors are driven off. The residue is taken up with a little water, after which 80 c. c. of soda solution of 15° B. and 10 c. c. of a 20-per cent solution of potassium cyanide are added, and the whole is diluted to 300 c. c., and then electrolized. The separation of the zinc from the aluminum is complete. In the presence of iron in the form of an oxide salt, 15 to 80 c. c. of soda solution are used. A small quantity of the iron is dissolved by the soda solution and is deposited together with the zinc. The precipitate of ferric oxide, resulting from the electrolysis, still contains zinc. Consequently it should be filtered off, dissolved in sulphuric acid, using as little of the latter as possible and neutralized with soda solution, this solution being added to the first filtrate. The solution is again electrolized, using the same cathode upon which the principal portion of the zinc has already been deposited. The separation of zinc from nickel in this manner is not practicable. The electrolysis of solutions of zinc sulphate in the presence of organic acids and a small excess of acetic acid gives good results only with pure solutions. In the presence of iron especially the latter method is inapplicable.

THE MANUFACTURE AND IMPURITIES OF COMMERCIAL CYANIDE.

By ALFRED H. ALLEN.*

Potassium cyanide is a product of the first commercial importance. It has long been employed in the electro-deposition of metals, in photography, for cleaning silver, etc.

A cyanide always results from the ignition of nitrogenous organic matter with caustic or carbonated alkali, but until recently almost the only process for preparing potassium cyanide which has been found commercially available has consisted in the ignition of a mixture of dry potassium ferrocyanide and potassium carbonate to dull redness, when the following reaction occurs:—

$$K_4FeCy_6 + K_2CO_3 = KCyO + 5KCy + Fe + CO_2.$$

In order to obtain a good yield or a product of high quality it is essential to observe a number of precautions, some of which are kept jealously secret.

The product prepared by this process always contains cyanate, and usually carbonate. Sulphide is also present if the alkali used contained any sulphate. By heating potassium ferrocyanide alone, or by adding charcoal or sodium to the mixture, the formation of cyanate may be avoided. By replacing the potassium carbonate by sodium carbonate, a product containing a higher percentage of cyanogen is obtained, owing to the lower combining weight of sodium; and by substituting sodium ferrocyanide for the potassium salt, a product is obtainable which contains cyanogen equivalent to 100 per cent., or even more, of potassium cyanide. One hundred per cent. potassium cyanide is now manufactured by Erlenmeyer's process, in which potassium ferrocyanide is heated with metallic sodium:—

$$K_4FeCy_6 + Na_2 = 4KCy + 2NaCy + Fe.$$

Potassium cyanide fuses at a low red heat to a transparent liquid, which is a most powerful reducing agent, liberating tin, antimony, bismuth, lead, etc., from their oxides and sulphides, with formation of potassium cyanate or thiocyanate. The thiocyanate also results from fusing the cyanide with free sulphur or a thiosulphate (hyposulphite), or by boiling the aqueous solution with sulphur.

$$KCN + 2H_2O = KCHO_2 + H_3N.$$

Potassium cyanide seems to volatilize unaltered at a white heat. It is frequently formed in considerable quantity in blast furnaces. When heated in the air it forms cyanate, and in presence of vapor of water potassium carbonate and ammonia result.

By the action of potassium permanganate in presence of caustic alkali, on a cold solution of potassium cyanide, cyanate is formed.

Cyanide of potassium generally occurs in commerce in milk-white cakes or rods, but it may be obtained in cubes by crystallization from hot alcohol. It is very deliquescent and soluble in water, forming an alkaline and intensely poisonous liquid. Potassium cyanide may be kept unaltered in close vessels, but in the air it absorbs carbonic acid with liberation of hydrocyanic acid. By passing a stream of carbonic acid gas through the aqueous solution the cyanide may be completely decomposed. On boiling the aqueous solution, potassium formate and ammonia are gradually produced:—

$$KCN + 2H_2O = KCHO_2 + H_3N.$$

Potassium cyanide unites with most of the cyanides of the heavy metals forming more or less stable double cyanides much used in electro-metallurgy. Owing to the strong tendency which exists to form a double cyanide of potassium and silver, potassium cyanide dissolves all silver compounds except the sulphide. Hence its employment as a fixing agent in photography.

Commercial cyanide of potassium is most conveniently assayed for the proportion of real cyanide present by Liebig's silver process. The results are not affected by the ordinary impurities of commercial cyanide, with the exception of soluble sulphides, which must be removed previous to titration. The process is carried out as follows:—6.510 grams (= 100.5 grains) of the powdered sample are treated in a 500 c.c. flask with about 300 c.c. of cold water. When solution is complete, about 1 gram of lead carbonate (white lead) should be added, and the flask strongly agitated to convert any soluble sulphides into sulphide of lead. The solution is now diluted to 500 c.c., well agitated, and passed through a dry filter. One hundred c.c. of the filtrate is then treated with a few drops of a solution of potassium iodide, and titrated with decinormal silver nitrate, which is added until a white turbidity or milkiness is produced, which is permanent after agitation. The flask containing the solution should be placed on a black surface. When the above quantities are employed, each c.c. of the decinormal silver solution corresponds to 1 per cent. of cyanide, expressed in terms of potassium cyanide.

By the substitution of sodium carbonate for the potassium salt, an article is now prepared which shows on assay from 98 to 100 per cent. of "potassium cyanide," and by employing sodium ferrocyanide a product even richer in cyanide is obtainable.

The potassium cyanide required for electro-gilding should contain 90 per cent. of real KCy. For electroplating liquids 70 per cent. cyanide can be used, whilst for photographic purposes a less pure article than the latter will suffice.

Owing to its manner of preparation, and to the materials employed, commercial potassium cyanide contains many impurities, the chief of which are:—Potassium cyanate, potassium thiocyanate, potassium ferrocyanide, potassium formate, potassium chloride, potassium carbonate, potassium silicate, potassium sulphate and potassium sulphide. In addition to these compounds of potassium (and sodium), commercial cyanide may contain more or less alumina, calcium compounds, etc., and in old damp cyanide ammonia is frequently present. The presence or absence of some of the above impurities will depend upon the quality of materials used, the employment of damp materials, the free admission of air, or the use of an unsuitable temperature.

The above impurities may be detected in the following manner:—

Potassium cyanate will dissolve in alcohol of specific gravity 0.849, and this solution, on addition of hydrochloric acid, will evolve carbon dioxide. Or, on adding water to the alcoholic solution, and boiling off the alcohol, the liquid will give a precipitate of calcium carbonate with calcium chloride. Cyanate may also be detected by the following application of Blomstrand's color-reaction:—A strong solution of the sample is decomposed by passing carbon dioxide through it until no more hydrocyanic acid is evolved. By these means E. A. Schneider (*Journal*, Society Chemical Industry, 1895, p. 887) found that 3 grams of potassium cyanide were decomposed in 45 minutes. To the resulting liquid Schneider adds sufficient 95 per cent. alcohol to precipitate the potassium carbonate formed. The filtrate is then slightly acidified with acetic acid, and some cobalt acetate solution added. An intense blue color, due to the formation of the double cyanate of cobalt and potassium, is produced, which renders easy the detection of as little as 0.35 per cent. of cyanate. If present in smaller quantities, more of the cyanide must be taken, dissolved in the smallest possible quantity of water, and the greater part of the cyanide precipitated by the addition of absolute alcohol. The filtrate is then treated with carbon dioxide, and tested as before.

Chlorides may be detected by silver nitrate, added in excess, which throws down silver cyanide as a white curdy precipitate. They may be determined by Siebold's volumetric method.

L. Siebold has shown that chlorides, when present, may be conveniently determined in the same liquid in which the cyanide has been estimated by neutralizing the excess of free alkali (which should not be ammonia) by the cautious addition of dilute nitric acid, adding a few drops of a solution of neutral potassium chromate, and continuing the addition of the silver solution until the red tint due to the formation of silver chromate remains permanent. If cyanide only be present, the volume of silver solution now required will be exactly equal to that previously employed to obtain a permanent turbidity, whereas any excess over this amount represents the silver solution corresponding to the chlorides present.

Formates, if present, will cause the salt to blacken on ignition. They may be detected more certainly by precipitating the cold dilute solution of the sample with excess of silver nitrate solution, filtering cold and heating the clear liquid. In presence of a formate, metallic silver will be precipitated. The filtrate from the precipitate produced by silver nitrate will also give a red color with ferric nitrate or sulphate if a formate be present.

Carbonates will remain insoluble on treating the sample with hot alcohol of 0.849 specific gravity.

Silicates can be detected and estimated in the ordinary way by evaporation to dryness with hydrochloric acid, the residue insoluble in acidulated water being silica.

Sulphates are detected by the formation of a white precipitate on adding barium chloride to a solution of the sample previously acidulated by hydrochloric acid.

Sulphides will give a black precipitate with mercuric chloride, and a yellow precipitate with a solution of cadmium. They can be separated by agitating the solution with lead carbonate.

Free ammonia can be recognized by the smell, and determined by treating the solution with an alkaline solution of sodium hypobromite and measuring the nitrogen gas evolved.

* Abstracted from Vol. III., Part III., of "Commercial Organic Analysis," by Alfred H. Allen. Published by P. Blakiston's Son & Co., Philadelphia.

EXPERIMENTS WITH SAFETY EXPLOSIVES.—Beyling, in *Glückauf*, XXXIX, 434, reports the results of experiments in Westphalia to determine what weight of various so-called safety explosives can be used without danger in the presence of fire damp and coal dust. The experiments were made with German explosives, but are of interest to American coal miners. The greatest risk is from blown out shots, and in the experiments the conditions existing in such cases were reproduced. It was found that with wittenberg, wetterdynamit, kohlenkarbonit and karbonit No. 1 the safe maximum charge was 1,000 grams; with karbonit No. 2 850 grams; with Phoenix I, 700 grams; with ammoniumcarbonit, 550 grams; with safety gelatine dynamite Ia, 500 grams; with roburite Ia, 500 grams; with dahmenite A, 400 grams; with ammonium carbonite I, 350 grams; with gelatin dynamite, 300 grams; with roburite Ic, 250 grams; with Westfalite and Köln-rottweiler safety powder, ignition occurred with charges of less than 50 grams. Most of the explosives tested were found to be only one-half to three-quarters as powerful as ordinary gelatin dynamite.

PRODUCTION OF THE RARE METALS.—According to the report to the United States Geological Survey, for 1902, by Dr. Joseph Hyde Pratt, the production of crude tungsten ores during 1902 amounted to 183.5 tons, of which not more than a few tons were sold. The larger part of the production was from Colorado, with a smaller amount from Connecticut. No new localities were developed during 1902.

Almost the entire production of commercial molybdenite was by the Crown Point Mining Company, of Seattle, Wash., from their property in the western part of Chelan County. The production amounted to about 12 tons. The value of the ores is very erratic, the prices quoted varying from $1,500 to $100 per ton.

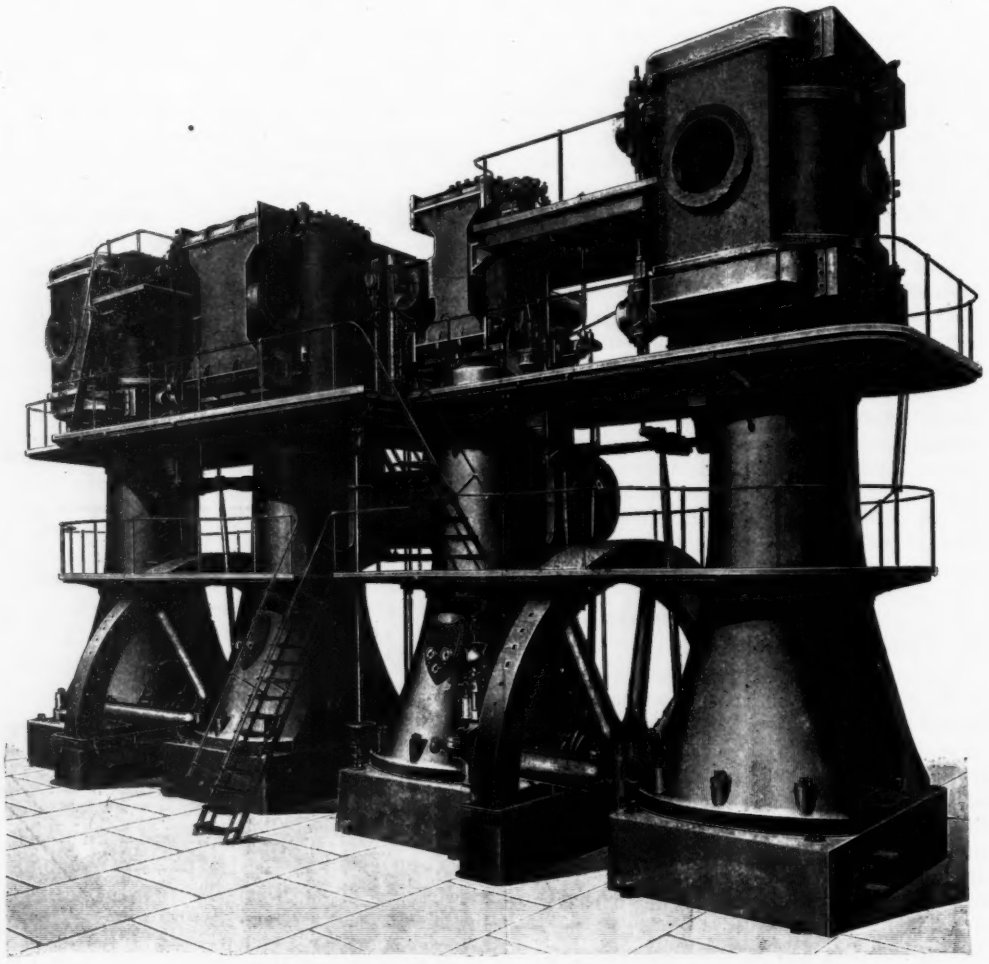
There was a marked increase in the production of uranium and vanadium minerals in 1902, which, as reported to the Survey, amounted to 3,810 tons, valued at $48,125, or $12.63 per ton. This, of course, represents the crude ore. A portion of the uranium ore was treated, giving a concentrated product of 25 tons.

AN ENGLISH BLOWING ENGINE OF AMERICAN DESIGN.

We are indebted to the London *Engineer* for the accompanying engravings of a new blowing engine of American design, just completed in England; also for the following description of the engine:

It has been found in the United States that the use of high blowing pressures, with the steam and air cylinders on the same rod, was a practical impossibility, owing to the heavy shocks which are inevitable with such construction. Such blowing engines are in accordance with the type most usual in this country, where they do perfectly well for the comparatively low pressures hitherto employed. When, however, their use at high pressures had been tried in the United States, it was not found feasible, without accidents and stoppages. Hence the invention of the so-called quarter-crank engines, which may be briefly described as blowing engines, in which the quarter-crank blowing engines, which have recently been completed by this firm for the Barrow Hematite Steel & Iron Company, Limited.

Before going on to give details and sizes of these engines, we may perhaps with advantage make a few remarks as to the general design. We are informed that the American drawings had been worked to absolutely and that no alteration of any kind had been made. There are two salient points which strike the observer when he first sees these engines. One of these is the solidity of construction, and the other the simplicity of design. They form an excellent example of good engineering. There is practically nothing that could by any possibility get out of order which is out of sight. Each motion is adjustable, and with ease. There does not appear to be one single useless part, nor one that could be dispensed with. Such design is in sharp contrast to the engines of Swiss manufacture, on which we lately commented,



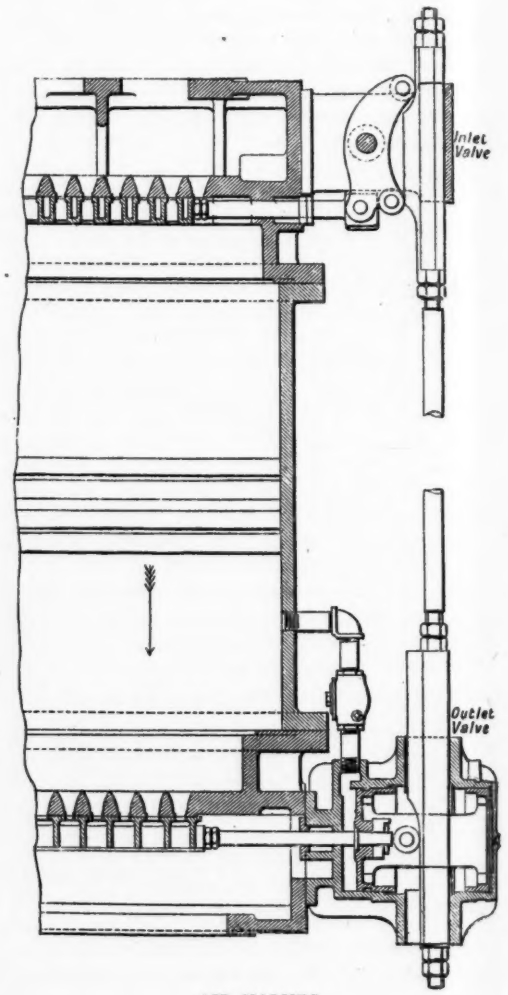
QUARTER CRANK BLOWING ENGINE OF 3,000 H. P.

cranks are set at such an angle that the resistance in the air cylinders reaches a maximum before the steam is admitted to the steam cylinders. With this arrangement shocks are avoided, and much higher speeds and pressures are possible.

The firm of Richardsons, Westgarth & Co., Limited, became so certain that this method of construction was not only the correct, but practically the only solution of the difficulty, that they decided, so as to keep the orders in this country, to make this type of engines. Accordingly, a representative was sent to America, and he succeeded in acquiring, on behalf of his firm, the rights to use the drawings of the Southwark Foundry and Machine Company, of Philadelphia. This company has the reputation of being a successful builder of this class of engines. Messrs. Richardsons, Westgarth & Co. are primarily marine engineers, but they have applied themselves to the manufacture of this entirely different class of engine —and indeed of gas engines, steam turbines, and electrical plant as well—with great success.

Our engraving represents a fine set of 3,000 h. p. and which—though of beautiful construction—seem to be a mass of parts. Solidity and simplicity, then, impress themselves on the eye in the first instance. Then, on closer examination, the excellence of the workmanship and finish can be appreciated. It is true the machines are made from American drawings, but the workmanship is very unlike most of that which comes from America. We did not see the rough surfaced castings, or the unmachined parts which we have grown accustomed to look for in American engines. The design is undoubtedly good, so is the workmanship, and the combination with good material—which we make no doubt has been used throughout—should produce good and lasting results.

An examination of the engraving will show that but little general explanation is necessary. The set of engines consists of two complete blowing plants placed side by side and unconnected mechanically. Indeed, but for a reheater through which the exhaust steam from the steam cylinders of one engine can pass to the steam cylinder of the other engine, they are entirely independent. They can be run separately or combined. The two steam cylinders together form a compound engine which can either work condensing or non-condensing. The steam cylinders are 42 in. and 84 in. in diameter respectively, and they each have a 5-ft. stroke. The air cylinders are both of them 84 in. in diameter, with a 5-ft. stroke. The steam cylinders are fitted with Cor-



AIR VALVES.

liss valves with trip action. The air cylinders have what are known as Southwark slide valves, made under the patents of the Southwark Foundry and Machine Company. We shall have occasion to refer to these in greater detail later on. The steam pressure is 150 lb. and the normal speed is about 50 revolutions per minute, which is equivalent to a duty of about 20,000 cubic feet of free air.

They can, however, be worked as high as 80 revolutions per minute, and with a maximum pressure of 30 lb. on the square inch. There is, as has been said, no mechanical connection between the crank shafts of the two engines, and each has a flywheel which is 20 ft. in diameter and weighs 30 tons. This weight is necessary for the full compression of the air in the air cylinders before the steam is allowed to enter the steam cylinders. The total weight of the engines is 400 tons.

The high-pressure cylinder is controlled by a governor which can be set to run at any speed. It is chain driven, and the adjustment is brought about by a friction arrangement, a horizontal disk being impinged on by a wheel which has a fibre periphery, and which can be moved either nearer to or further from the center of the horizontal disk, thereby altering its effective diameter, and hence its speed. The adjustment is actually made by the small impinging wheel, which can be made to slide to and fro on a spindle by means of a screw and hand wheel. The whole of the steam valve gear can be readily made out from the engraving. The action of the air valves is shown in the drawing given herewith. It is, as a fact, extremely simple. The inlet valves are positive in action, the necessary movement being

brought about by a roller passing up an inclined plane on a guided shaft. The outlet valves, however, are worked in an entirely different manner. It is necessary, of course, that they should not be opened until the pressure in the cylinder is at least equal to the pressure in the discharge mains. A small cylinder is therefore provided, which is in communication with the air-compressing cylinder, and arrangements are so made that when the pressure reaches the predetermined amount a piston in this small cylinder is pushed backward, and being connected with the valve by a rod, the former is opened. The closing is brought about by a positive action, as in the case of the inlet valves, which are positive in both directions. The air and steam cylinders are both of them double-acting. There are high-pressure auxiliary valves to both cylinders for starting purposes. The cut-off of the low-pressure cylinder can be varied by hand. The exhaust is direct-acting. There is, as will be seen, a re-heater between the two cylinders. High-pressure steam is used for this apparatus. It is to be understood that the two engines, although they can work together, can also work entirely independently. For this purpose the low-pressure cylinder can be supplied with high-pressure steam through a reducing valve. Moreover, the engines are made strong enough to work at a speed which is nearly twice their normal rate. Thus, if one was to break down, the other could keep a furnace going, the ports and passages being large enough to permit of this.

PIG IRON PRODUCTION IN CANADA.

The American Iron & Steel Association has received direct from the manufacturers the statistics of the production of pig iron in Canada in the first six months of 1903. The figures show a considerable decrease as compared with either of the two halves of 1902, as will be seen by the following table, which gives the production by fuels, in gross tons, in half-yearly periods:

	1902.		1903.
	First half.	Second half.	First half.
Coke	147,892	154,820	123,500
Charcoal	9,912	6,932	9,430
Totals	157,804	161,753	132,930

The decrease in production in the first half of 1903 as compared with the first half of 1902 was 24,874 tons, or over 15 per cent., and as compared with the second half of 1902 it was 28,823 tons, or over 17 per cent. Of the total production in the first half of 1903, 69,325 tons were basic pig iron, against 57,209 tons in the first half of 1902 and 50,106 tons in the second half of that year. A small quantity of bessemer pig iron was produced in 1902, but no bessemer pig iron was made in the first half of 1903.

The unsold pig iron held by Canadian manufacturers on June 30, 1903, none of which was intended for their own consumption, amounted to 13,585 gross tons, as compared with 20,041 tons on December 31, 1902, and 37,721 tons on June 30, 1902. Of the unsold stocks on June 30, 1903, about 200 tons were made with charcoal, the remainder being coke iron.

On June 30, 1903, Canada had 14 completed blast furnaces, of which nine were in blast and five were idle. Of this total, nine were equipped to use coke for fuel, four to use charcoal and one to use mixed charcoal and coke. In addition one charcoal and three coke furnaces were being built on June 30, 1903, and two coke furnaces were partly erected. Work upon the latter furnaces was suspended.

The following list shows the constitution of the blast furnaces in Canada during the first half of the present year:

The Bridgeville Mining Company, of Bridgeville, Nova Scotia, is now the owner of Bridgeville Furnace. It has been long idle and is not likely to resume work. When last in operation it used mixed charcoal and coke.

The Dominion Iron & Steel Company, Limited, had three of its four coke furnaces in blast on June 30. The company is uncertain when the idle furnace will be blown in.

The Londonderry Iron & Mining Company, Limited, of Londonderry, Nova Scotia, expects to have one of its two furnaces rebuilt and in operation by October 1. Neither furnace made pig iron in the first half of 1903.

The Nova Scotia Steel & Coal Company, Limited, of New Glasgow, operated its coke furnace at Ferrona for 19 weeks during the first half of 1903. The company is building a new coke furnace at Sydney Mines, Cape Breton, which it now hopes to have completed early in 1904. This furnace will be 85 by 17 ft. and will have a daily capacity of about 200 tons of basic and foundry pig iron. The daily capacity of the furnace at Ferrona is about 90 tons.

The Canada Iron Furnace Company, Limited, operated its charcoal furnace at Radnor Forges, Quebec, for 21 weeks during the first half of 1903. Its Midland Furnace, at Midland, Ontario, which uses coke for fuel, also ran for 21 weeks. Both furnaces were blowing on June 30.

Messrs. John McDougall & Co., of Montreal, had one of their two charcoal furnaces at Drummondville, Quebec, in operation for 26 weeks during the first half of 1903. The idle furnace will be started about October 1.

The Algoma Steel Company, of Sault Ste. Marie, Ontario, had not blown in either of its two furnaces on June 30, although both stacks were practically completed on that date. One stack will use charcoal and the other will use coke. Both are expected to be blown in August.

The Hamilton Steel & Iron Company, Limited, of Hamilton, Ontario, operated its coke furnace for 17 weeks and 4 days during the first half of 1903, making foundry pig iron. The furnace was in blast on June 30.

FERRO-SILICON IN FRANCE.

A recent report from United States Consul-General Robert P. Skinner, at Marseilles, France, says:

"Ferro-silicon manufactured by electrical process is now being shipped regularly in commercial and rapidly increasing quantities from France to the United States. It is being forwarded both from Grenoble, the shipping point nearest the place of manufacture, and Marseilles. During the year ended June 30, 1903, the exports from Marseilles amounted in value to $33,242, as compared with $196 in 1892, and there are evidences of an increasing demand and capacity to satisfy that demand. The concerns principally interested as manufacturers in this enterprise are the Compagnie Electro-thermique Keller, Leleux & Co., 3 Rue Vignon, Paris (works at Livret-et-Gavet, Isère); the Compagnie Générale de l'Electro-Chinie, Bozel, Savoie; and the Société Electro-Chimique de la Romonche, Livret-et-Gavet, Isère. The rapid development of this industry has been enveloped in all the mystery compatible with the marketing of the product. The shipments of the material are made by middlemen, who desire to retain as their own property such facts as may be called trade secrets.

"In the French Alps the work of damming streams for the generation of electricity has been going on for about four years with feverish activity."

SHIPBUILDING IN THE UNITED STATES.

The "Blue Book of American Shipping" which has just been issued by the *Marine Review* Publishing Company of Cleveland, Ohio, gives some interesting figures on American shipping and shipbuilding in 1902. This book, which during the eight years it has been published has earned a position as the standard marine directory, includes also many valuable statistics, and we take the following notes from the introduction to the new volume:

"Except on the great lakes there is little encouraging to report regarding ship building in the United States. Orders have become few and far between. During the fiscal year ended June 30 last 1,536 vessels of 456,076 gross tons were built in the United States, compared with 1,657 vessels of 473,981 gross tons for the previous fiscal year. Vessels now under construction indicate a further lessened output for the coming fiscal year. The principal decrease for the past year has been in steel steamers built on the great lakes, which number 41 of 131,600 tons compared with 52 of 161,797 tons for the preceding year. The previous year was the one of greatest output in the lake district. On the seaboard 18 ocean steel steamers of 101,471 gross tons were built—the largest output of this type in our history. Only five of them, however, can properly be credited to oversea service. A few contracts have been received by the coast ship yards for some splendid vessels for the coastwise service. . . .

"A foreview of ship building on the great lakes does not show many orders in abeyance. A year ago the shipyards were filled up with orders for a full year ahead. But that is not the case now. The lake shipyards, broadly speaking, are now well up with their work. If they had to do so they could probably turn out all orders on hand within six months. Those best informed, however, do not take a dubious view of things on the great lakes. The industry, as stated before, is special; the ships are not like other ships; the shipping is not like other shipping; it is not made up of a multiplicity of things as is ocean carriage, but is confined to a few items in bulk; these items are likely to continue to be moved for years in a constantly ascending scale and ships will continue to be built to carry them. Moreover, a fair part of existing tonnage on the lakes is wooden; it is old and decaying and must go the way of all craft; and it must be replaced by new and more modern carriers. Thus shipbuilding on the lakes for many years is assured, although the number of orders for the coming year will fall considerably short of the business of any of the past three years."

A NEW METHOD OF MAKING CYANIDE.

In a paper read before the Fifth International Congress of Applied Chemistry, recently held in Berlin, G. Erlwein described a new method for the manufacture of cyanides, wherein the nitrogen constituent is obtained from the atmosphere by the action of atmospheric nitrogen on barium carbide or calcium carbide. After various experiments with those substances, it was found that calcium cyanamide could be formed by the action of nitrogen on a mixture of lime and carbon heated in an electric resistance furnace, and that, morever, it was possible by a simple leaching process to convert the calcium cyanamide into dicyandiamide, which can easily be purified by crystallization, the reaction being expressed as follows:

$$2\,(CN.NCa) + 4\,(H.OH) = (CN.NH_2)_2 + 2Ca(OH)_2$$

Dicyandiamide, upon fusion with sodium carbonate, is largely converted into pure sodium cyanide, marketable without further treatment, while the ammonia which escapes can be recovered by absorption in sulphuric acid in the usual manner, and the remaining dicyandiamide is returned to the melting pot during the treatment of a fresh quantity of the raw material. Besides pure cyanide, other nitrogeneous compounds having a high value as fertilizers can be manufactured by the process. According to Frank, in a paper read at the same meeting, calcium cyanamide applied directly to land has a fertilizing value at least as high as that of ammonium sulphate, containing an equivalent quantity of nitrogen, and not far below that of sodium nitrate. It is considered that crude calcium cyanamide (containing 14 to 22 per cent N) and possibly cyanamide itself (containing 66 per cent N) may become valuable commercial fertilizers.

PRODUCTION OF BARYTES.—The production of crude barytes in 1902, as reported to the United States Geological Survey by Dr. Joseph Hyde Pratt, was considerably in excess of that of 1901, amounting to 61,548 short tons, valued at $195,983. The States producing barytes in 1902 were Virginia, North Carolina, Tennessee and Missouri.

ABSTRACTS OF OFFICIAL REPORTS.

Camp Bird, Limited, Colorado.

The first report of this company, just issued from the London office, covers the period from May 12, 1902, to April 30, 1903. The nominal capital of the company is £1,100,000, of which £820,000 has been issued and fully paid. The net profit for the year was £249,859, from which there were paid five dividends, £164,000 in all; £16,536 for taxes, etc.; and £15,000 for depreciation of plant, leaving a balance of £54,323 forward to current year.

The directors' report says: "It is proposed to write off £15,000 for depreciation of plant for the year, this amount being approximately 20 per cent of the estimated value of the machinery and equipment as at May 12, 1902. The manager advises that this amount should be written off the first year, but that, in the future, 10 per cent per annum will be sufficient.

"The development of the mine has proceeded very satisfactorily, a total of 6,425 ft. having been driven, raised, or sunk, in the various workings. The most important developments during the year have taken place in the western portion of the mine, where the Big Discovery stope has been extended to a height of 170 ft. above the second level. The intermediate drift at 150 ft. above the same level has been driven 750 ft. in payable ore ranging from 5 ft. to 14 ft. in thickness. The first level, 150 ft. above the intermediate and 300 ft. above the second level, is now also being driven in payable ore. The vein has been cut by the Chicago tunnel 415 ft. above the top of the Big Discovery stope. From the point of intersection, drifts have been run for a distance of 145 ft. in ore 5 ft. wide and with an average value of $50 per ton. The manager advised us that the reef then pinched, and that, owing to the inaccessibility of the tunnel, he had decided to temporarily suspend work until direct communication had been effected with the main workings of the mine.

"The reports of Messrs. Hammond and Cox show that after treating 66,825 tons of ore the reserves were, at April 30 last, 81,334 tons of ore broken in the stopes and 142,017 tons blocked out, making a total of 223,351 in reserve, which Mr. Hammond estimates will yield a profit of approximately $4,294,650, say £880,051.

"From the ore treated during the period under review an extraction of 90 per cent of the values has been made, yielding $29.55 per ton. The working expenses, including mining, milling, transportation and smelting charges, taxes and all other expenses at the mine, amount to $10.66 per ton, having a profit of $18.89 per ton. All machinery has worked satisfactorily during the year. A sum of £15,933 has been spent on additions and improvements to the buildings and machinery."

The statement of earnings and expenses, in sterling, is as follows, the averages per ton being reduced to United States currency:

	Amount.	Per Ton.
Sales of bullion	£316,505	$22.734
Sales of concentrates	76,478	5.492
Sales of cyanide slags	741	0.052
Miscellaneous	1,730	0.124
Bullion in transit April 30	9,418	0.674
Total receipts	£404,872	$29.076
Mining	£75,687	$5.436
Tramway	2,962	0.212
Stamp mill	16,384	1.176
Cyanide mill	8,757	0.628
Shipping and selling	22,564	1.616
General expenses	14,706	1.056
Expenses on unpatented claims	5,012	0.360
Total expenses	£146,072	$10.484
Profit for the year	£258,800	$18,592

The report of Mr. William J. Cox, general manager, says: "During this fiscal period the earnings were $1,976,290, the operating expenses $662,685, and the net earnings from operation $1,313,605. The percentage of operating expense to earnings is 33.53 per cent, thus leaving the gratifying profit of 66.47 per cent. To the net earnings have been added $8,443 in miscellaneous revenue, thus making the net earnings, $1,322,048, from which there have been deducted $13,998 for taxes, and $15,042 for adjustment of inventory at September 30, 1902, leaving the profit at the mines and mills (exclusive of equipment) $1,293,007.

"During the period ended April 30, 1903, 111,245 tons of ore were broken, of which 71,793 tons were delivered to the mills, and 39,452 tons left in the stopes. On May 12, 1902, there were 46,943 tons in the stopes, making a total in the stopes April 30, 1903, of 86,395 tons, or 81,344 tons of dry ore. Deducting the moisture from the ore treated, leaves 66,825 tons of dry ore, from which was recovered in gress values the sum of $1,974,704, or an average per ton of $29.55. It is estimated that the average per ton production of $29.55 for this period is higher than will obtain from ore broken in stopes by approximately $3.37 per ton, due to high estimated moisture in crude ore in May, June, July and August, the abnormal production of high-grade ore through development in October and December, and the value of ore in stopes May 12, 1902.

"In the stamp mill there were treated 71,793 tons of wet, or 66,825 tons of dry ore, which included amalgamation, concentration; and since February 19 re-grinding and re-amalgamation of the coarser sands. Out of 354 days (the fiscal period) this mill was in operation 346 days, 15 hours and 21 minutes, having lost 7 days, 8 hours and 39 minutes. In the cyanide mill there were treated 65,999 tons (estimated) of dry tailings. Some additions and changes in this plant are nearing completion, when a classification of tailings before their deilvery to the vats will be had. A large percentage of the values formerly passed to this mill are now recovered in the stamp mill through re-grinding. This mill was in operation 344 days, 20 hours and 28 minutes, having lost 9 days, 3 hours and 32 minutes."

The condensed statement for the two mills is as follows:

	Stamp Mill.	Cyanide.
Recovery	$1,842,816	$131,888
Maintenance	$14,212	$8,593
Operating	61,590	37,765
Total charges	$75,802	$46,358
Net recovery	$1,767,014	$85,530

The report of Mr. John Hays Hammond, consulting engineer, says: "The 60-stamp battery and its appurtenant concentrating and cyanide plants have been in continuous operation, and have treated 66,825 tons of dry ore, yielding $1,974,705. After deducting the cost of operations, etc., we have a profit for the year of $1,293,007. The maps accompanying Mr. Cox's report give you in detail the character and extent of the mining developments during the past year. These developments have been confined almost entirely to drives, raises, crosscuts and winzes above the third level. We have deferred developments below this level until the installation of our electric hoist, now in course of erection. It would have been excessively costly to have carried on this work with our present plant.

"The most important result of our developments is the intersection of the vein by the Chicago tunnel at a point 538 ft. vertically above the second, the highest adit level of the mine, where the vein was 5 ft. in width and of exceptionally high grade, running about $50 per ton. The lateral extent of this ore-body has as yet not been proved, but east and west drifts upon the vein are being rapidly run for this purpose. Although this ore-body is undoubtedly to be correlated with that of the Big Discovery stope, actual developments must be made to determine its extent, both upwards and downwards. There can be no doubt, however, that the occurrence of payable ore at this horizon indicates an extensive, if not actually persistent, mineralization of this rich ore shoot, and justifies the inclusion of the partially blocked-out ground referred to in our estimation of the ore reserves.

"I have considered with Mr. Cox the estimation of the mine's ore reserves, which we have classified as: (*a*) Ore broken in the stopes, which we estimate at 86,395 tons of wet ore, having a gross recoverable value of $2,129,528 and a net value of $1,697,554; and (*b*) ore partially blocked out but not technically in sight. In this class we include also a large tonnage of ore well blocked out. We estimate the tonnage of ore of this class at 151,082 tons of wet ore, having a gross recoverable value of $3,692,442 and a net value of $2,597,097. While the bulk of this ore is not blocked out, our knowledge of the ore occurrence in this part of the mine, together with the discovery of the ore-body on the Chicago tunnel level, lead us to believe this amount of ore can be safely relied on for future exploitation. The total gross value of the ore reserves thus defined we accordingly estimate at $5,821,971 and the net value at $4,294,651. The net value of our present ore reserves are about $1,800,000 greater than when we purchased the property, despite the abstraction of the sum of $1,313,604 as earnings of the past year.

"Owing to the lack of systematic and segregated accounts during the previous management, it is impossible to make a comparison showing the economies we have effected during the past year. Nevertheless, we have attained considerable success in this regard, and have, at the same time, been able to realize, by improved metallurgical processes, a higher extraction than formerly of the metal values of our ore. I have within the past few days succeeded in obtaining some important concessions from the Telluride Power Company, which will result in a considerable decrease in the cost of power used at our mine and mill; and have, at the same time, provided for additional power upon advantageous terms, when, in the near future, this increase shall be required.

"There has been some unmerited criticism of the management with reference to the fluctuations in monthly production. While the ore deposits of the Camp Bird mine are too extensive and reliable to be classed as patchy or pockety, they nevertheless must be included in the category of veins which are characterized by the occurrence of ore-shoots wherein the grade of ore is subject to considerable variation. Consequently the daily mill returns show a great range in the value of the ore treated. In view of this fact, it is obviously impossible, without an excessive increase in the mining cost, to maintain uniformity in the mill production and to avoid monthly fluctuations in the profits of the mine. It is the aim of the management, however, to minimize this disparity. In this connection I would caution the shareholders against being either too highly elated or too greatly depressed on account of any abnormal increase or decrease in the monthly profits of the company. We shall endeavor, and confidently hope, to be able to render annual statements of earnings which shall be entirely satisfactory to the shareholders.

"I would state that the past year's operations have been extremely gratifying. The profits, you will see, are far in excess of those promised by me in my report of May, 1902, when I had the pleasure of recommending to the shareholders the purchase of the property.

"I desire to express my appreciation of the loyal and efficient services rendered by my assistant, Mr. A. Chester Beatty; your manager, Mr. William J. Cox, and his able staff of assistants, in connection with the administration of the company's property. It is with pleasure that I also acknowledge the liberal treatment shown the management by the former owner of the mine, the Hon. Thomas F. Walsh, in the adjustment of monetary and other differences incident to the transfer of the property."

PRODUCTION OF FLUORSPAR.—There was a very large increase in the production of fluorspar in 1902 over that of 1901, says Dr. Joseph Hyde Pratt, in his report to the United States Geological Survey, which was partly due to its increased use for metallurgical purposes. The production in 1902 was 48,018 short tons, valued at $271,814. Of this production 43,310 short tons, valued at $224,814, are reported to have been sold in the crude state. There was an increase in price of both the crude and the ground fluorspar, the average price for the crude being $5.19 per ton, an increase of 19c., and for the ground the price averaged $9.98, an increase of 76c. over the 1901 price. Besides the above production,

there were 3,520 tons of fluorspar mined but not put on the market.

PRODUCTION OF TALC AND SOAPSTONE IN 1902.—The production of talc and soapstone in 1902, as reported by Dr. Joseph Hyde Pratt to the United States Geological Survey, was, exclusive of the fibrous talc of New York, 21,640 short tons, valued at $413,497.

There was a considerable decrease in the amount of rough talc sold, and of this amount nearly one-half was of North Carolina production. While there has been a decrease in tonnage of the manufactured articles, there has been a large increase in value, due partly to the increase of the North Carolina talc that was manufactured into tailors' pencils and gas tips, and to the expensive articles made from the Virginia soapstone. Nearly all of the Virginia product is put on the market in the form of manufactured articles. Most of that from New Jersey, Pennsylvania and Maryland is put on the market as ground talc.

The production of the fibrous talc mined in St. Lawrence County, N. Y., and used principally in paper-making, amounted to 71,100 short tons, valued at $615,350.

The talc imported into this country, chiefly from France and Italy, was valued at $35,366 in 1902.

BOOKS RECEIVED.

In sending books for notices, will publishers, for their own sake and for that of book buyers, give the retail price. These notices do not supersede review in a subsequent issue of the ENGINEERING AND MINING JOURNAL.

A Review of the South Pass Gold District, Wyoming. By Henry C. Beeler, State Geologist. Laramie, Wyoming. Pamphlet, 12 pages.

Censo de la Republica Mexicana. 1900. *Etranjeros Residentes.* Mexico; published by the Secretaria de Fomento. Pages 228.

Censo y Division Territorial del Estado de Puebla. 1900. Mexico; published by the Secretaria de Fomento. Pages 640.

L'Or en Guyane Venezuelienne. By Norbert Paquet. Liege, Belgium; published by the *Revue Universelle des Mines.* Pages 142; with maps and illustrations.

Tabellen zur Bestimmung der Mineralien. By Dr. Albin Weisbach. Sixth edition; revised by Dr. Friederich Kolbeck. Leipzig, Germany; Arthur Felix. Pages 120.

Transactions of the American Ceramic Society. Volume V., 1902. Edward Orton, Jr., Secretary. Columbus, Ohio; Published by the Society. Pages 432; illustrated.

Statistics of Manufactures in Massachusetts. 1902. Prepared in the Bureau of Statistics of Labor; Charles F. Pidgin, Chief of Bureau. Boston, Mass.; State Printer. Pages 76.

Cyanid-Prozesse zur Goldgewinnung. By Manuel von Eslar and Dr. Georg Erlwein. Halle a. S., Germany; Wilhelm Knapp. Pages 120; illustrated. Price (in New York), $1.40.

Monographs on Meteorites. By Henry A. Ward and H. L. Preston. Rochester, N. Y.; reprinted from the *Proceedings* of the Rochester Academy of Sciences. Pamphlet; illustrated.

New South Wales Statistical Register for 1902. Part VI. Manufacturers and Works. Part V. Industrial Wages. Part VIII. Shipping. Compiled by T. A. Coghlan, Government Statistician. Sydney, N. S. W.; Government Printer.

Report of the Superntendent of Technical Education for the State of New South Wales. By D. J. Cooper, Sydney, N. S. W.; published by the Department of Public Instruction. Pages 32; illustrated.

The American Ephemeris and Nautical Almanac for the Year 1903. Prepared by Prof. William Harkness, Director. Washington; published by the Bureau of Equipment of the Navy Department. Pages 504.

Twentieth Century Impressions of Western Australia. Memorial Volume prepared for presentation to T. R. H. the Duke and Duchess of Cornwal and York. Perth, W. A.; compiled and published by T. W. H. Thiel & Co. Pages, 800; illustrated.

BOOKS REVIEWED.

Experiments on the Flexure of Beams. Resulting in the Discovery of New Laws of Failure by Buckling. By Albert E. Guy. New York; the D. Van Nostrand Company. London; Crosby, Lockwood & Son. Pages, 124; with diagrams and tables. Price, $1.25, net.

This little book contains the result of some experimental work carried on by the author on the resistance of beams. It contains an account of these experiments and of the results obtained, with some remarks on the effect which those results should have upon the design and construction of beams. The work has evidently been well done and carefully carried out, and the results should be of value to engineers engaged in construction.

Ore Deposits. A Discussion re-published from THE ENGINEERING AND MINING JOURNAL. New York and London; THE ENGINEERING AND MINING JOURNAL. Pages, 90; price, $1.00.

This small volume embodies the latest views on the origin and classification of ore deposits. In substance, it is a record of the discussions held before the Geological Society of Washington early in 1903, which were reported in THE ENGINEERING AND MINING JOURNAL, but it contains many corrections and important amplifications of the material previously published. As an introduction to the discussion, the editor, Mr. T. A. Rickard, reviews in a concise way the recent progress in the study of ore deposits, setting forth those facts which will enable the reader to follow the argument as it is developed in the subsequent pages. The new classifications proposed by Messrs. W. H. Weed and J. E. Spurr furnish the subject of the debate, which is opened by Mr. S. F. Emmons, and is then taken up in order by Messrs. Weed, Spurr, W. Lindgren, J. F. Kemp, F. L. Ransome, T. A. Rickard, C. R. Van Hise, and is concluded by Mr. Weed. This list of prominent American geologists is representative of the various theories that are now seriously held by students of ore deposition, and thus the present position of those advocating the rôle of igneous rocks, of meteoric circulations and other agencies is clearly defined. Supplementing this discussion is an article by Mr. C. W. Purington, who compares some of the theoretical considerations with his own extended experience in the field, entering a plea that geologists may devote themselves rather to the ascertainment of fact than to the purely mental labor of constructing hypotheses.

The volume is valuable, in that it places on permanent record an important stage in the development of the study of ore deposits. It will be useful, therefore, to the advanced student as a book of reference, while the beginner will find in it an impartial résumé that may assist him in his future work.

West Virginia Geological Survey. Volume II. Containing Levels about Tide; True Meridians: Report on Coal. I. C. White, State Geologist, Morgantown, West Virginia; published by the Survey. Pages, 728. Price, $1.50.

This second volume of the West Virginia *Report,* the publication of which has been somewhat delayed by the reluctance of the legislature to appropriate a sufficient amount, contains three parts. The first section shows the elevations above tide level of a large number of points in the State as determined by actual field-work. It also contains some remarks on the methods of determining these levels, and instructions to surveyors for future work. The second part consists principally of tables showing the true meridians as finally determined by the Survey and by other workers in the field.

The third and most valuable part, which occupies over 600 pages, is the report on the coal mines of the State. This report, with much of the valuable information it contains, is due entirely to the State geologist, who had a number of years' experience in the West Virginia coal-fields before he was appointed to his present position, and who has made free use of the notes taken by him, in the present volume. This report begins with a general description of the Appalachian coal-field in which the West Virginia mines are situated. It goes on to treat of the general structure, the classification of the different beds and a study of the thickness of the carboniferous rocks. In succeeding chapters the author then takes up the different series included in the West Virginia coal area, treating in succession the Dunkard series, the Monongahela, the Conemaugh, the Alleghany, the Kanawha, the Pottsville and the Pocono. Incidentally this includes not only the coal but much of the oil-bearing strata of the State, as well as the limestones and standstones.

A good deal has been published from time to time on West Virginia's coal and coal mines, but this report is, we believe, the first attempt to put together the facts with regard to the coal-bearing area of that State in connected and continuous form. It constitutes a very valuable report both for study and reference, and its value will increase rather than diminish in the future. West Virginia is not by any means wholly developed as yet. Its coal areas, valuable as they have proved already, are not yet opened nor have they produced anything like the quantity of which they are capable. There is no doubt that it will be in the future one of the largest, if not the largest, coal-producing States in this country, and its mines will take the place of those of western Pennsylvania as the latter become gradually exhausted. This has been foreseen by coal-men, as is shown by the purchase during the last year or two of extensive tracts of West Virginia lands by Pennsylvania coal and coke operators. The central and northern areas of the State are already pretty well held either for present or future use, and later purchases have extended down into the Tug River country. In view of this interest the publication of the report on coal is timely, and gives it great value; moreover, this value is likely to be permanent, since whatever further investigations are made the present one must necessarily be adopted as a basis.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

SPECIALLY REPORTED.

DUTY ON TUNGSTEN ORE.—Tungsten ore is not dutiable as an unwrought metal under paragraph 183, tariff act of July 24, 1897; but it is entitled to free entry as a crude mineral, under the provisions of paragraph 614 of that act.—Appeal of Hempstead & Son from Collector of Customs at Philadelphia; Board of General Appraisers.

DUTY ON FINISHED CASTINGS.—Articles made out of cast iron, or castings, which have been turned, drilled, ground and polished, and which have been fitted together and fastened with bolts, screws or clamps, are not dutiable as castings, but are dutiable as manufactures of metal under paragraph 193, act of July 24, 1897.—Appeal of Schade & Co. from Surveyor of Customs at St. Louis; Board of General Appraisers.

DUTY ON ARTIFICIAL RUBIES.—Artificial rubies made, by combining chromium oxide and aluminum, producing an article identical in material, texture

and use with genuine rubies, are properly dutiable at the rate of 10 per cent ad valorem, as precious stones, cut but not set, either directly or by similitude by virtue of the provisions of section 7 and under the provisions of paragraph 435, tariff act of July 24, 1897.—Appeal of Mermod & Jaccard Company from Surveyor of Customs at St. Louis; Board of General Appraisers.

DUTY ON STRUCTURAL STEEL.—Pieces of flat steel 1 in. in thickness and of various widths and lengths are not structural forms or shapes provided for in paragraph 125, act of July 24, 1897. To fall within that provision steel must have a definite form or shape, which will make it readily recognizable as a form of structural steel. Such articles also are not covered by the provisions of paragraph 126 of the same act, but are dutiable under paragraph 135, according to value. When shapes or forms, not structural, have been sheared or stamped out of plate, they are no longer sheets or plates, but articles made therefrom having new names, character and use.—Appeal of McNear and others from Collector of Customs at San Francisco; Board of General Appraisers.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
Letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents.

Copper Sulphide in Iron Ores.—Oil Concentration.

Sir.—I understand that, in some of the Cornwall ores of Pennsylvania, there is so much sulphide of copper present with the oxide of iron as to render the ores practically useless as a source of iron. At the same time the percentage of copper is so small that the material is valueless as a copper ore.

It may be of interest to some of your readers to know that, by our process of concentration by oil, we have had great success in separating oxide of iron from copper sulphide. Cases of magnetite in association with chalcopyrite, which have resisted magnetic separation, have yielded to our method, giving a reasonably high-grade copper concentrate, salable to the copper smelters, and tailings of oxide of iron practically free from copper and sulphur.

Perhaps you would care to draw attention to this interesting fact in your JOURNAL.

A. STANLEY ELMORE.

London, July 28, 1903.

Difficulties in Chlorination.

Sir.—In reply to your correspondent, F. A., writing in your issue of July 25, I take pleasure in contributing the following data:

1. I have a vague account of the electric current being used in England to settle fine precipitates. I have more authentic accounts of the use of certain salts for this purpose. Prof. R. H. Richards, Massachusetts Institute of Technology, has written me upon this matter. He says that salts of bases of higher valence are more effective. Thus salts of lime are better than salts of sodium and salts of aluminum

2. Mr. Greenwalt, of Wall Street, Colo., and at pres- of using lime for settling precipitates (about 1½ lb. lime being used for 36 cu. ft.) and this probably was more than was necessary. I have seen elsewhere of the use of a salt of aluminum for settling.

2. Mr. Greenwalt, of Wall street, Colo., and at present at the Portland mill, Colorado Springs, Colo., has used electrical deposition of gold from chloride solution. With him, however, the solution after electrolysis was used over again; therefore residual gold in the solution was supposedly not lost. It is doubtful if electrolysis could precipitate the gold as completely as does sulphuretted hydrogen, from the large amounts of solution used in the ordinary barrel chlorination process.

3. Pressure, and also to a moderate extent heat, have influence in increasing the quickness of the solution of the gold. Probably also, when in barrel chlorination the barrel is full, or nearly full, of solution, the chlorine gas becomes, by the pressure of its confined generation, more intimately mixed with and dissolved in the water. Thus perhaps it reaches the gold more successfully. A. F.

Victor, Colo., Aug. 4, 1903.

Separating Precious Metals from Tin Oxide.

Sir:—We have been looking for some time for a satisfactory method for separating gold and silver from oxide of tin. We have this material in lots of about 100 lb. and containing about 3 per cent of gold, 10 per cent of silver, a little copper and sulphate of lead, the balance tin oxide. Our present method consists in reducing the whole to metal with carbon in a black lead crucible and oxidizing and skimming the tin off as an oxide with nitrate of soda. This yields us about 60 per cent of the value, the rest we have to send to others to separate.

We would greatly appreciate it, if you would suggest any method more satisfactory; or if any of your readers could do so. We should also like to recover the value of the tin if possible.

Aug. 1, 1903. REFINER.

A Personal Inquiry.

Sir:—My friend, Major C. von Petersdorff, mining engineer, late general manager of the Meysker Mining & Metallurgical Company, of Sonora, Mexico, is said to have died on March 12, at Sinaloa, Mexico, on his return from Alaska. The last address that he gave in August last year was Butte, Montana, where he intended to be present at the International Mining Congress in September last. From there he wrote at last to his family that he was leaving for Alaska and intended to return in March or April this year.

As the family of the late Mr. von Petersdorff, who only a short time ago were informed of his death, of which the particular circumstances are not known, —he is said to have died on the 12th of March at the hospital in Sinaloa, Mexico—is very anxious to learn something about the mission on which he went to Alaska and by whose authority he went and what his duty was, I take the liberty, after different inquiries have been made without success, to ask you kindly to insert this in your esteemed JOURNAL, as, in all probability, it will be read by some of his friends, who would be able to give some information on this affair.

I may mention that Mr. von Petersdorff was a member of the American Institute of Mining Engineers and of the Military Institution of the United States. Some years ago he was in the service of the California State Mining Bureau at San Francisco.

As one letter from Mr. von Petersdorff, dated March 31, 1902, directed to his family, was written on paper with your heading, I suppose that you may have known Mr. von Petersdorff personally. You would greatly oblige me by any information and assistance you could render me in this affair.

July 23, 1903. RICHARD CREMER,

(1 De Grey Terrace, Woodhouse Lane, Leeds, England.)

Magnesite in California.

Sir:—Having read the article on Magnesite by Mr. Schnatterbeck in your issue of July 11, and your last article in answer to a query in the issue of July 25, we wish to add our quota from personal knowledge of the magnesite deposits in California. The deposits of Tulare County are, as you represent, the only actual producers of magnesite at the present time and the quality is poor. Of this, about 800 tons per annum are bought to generate carbonic acid gas, the calcined residues being eagerly bought by the paper mills; while a much larger quantity is calcined at the mine near Porterville, and shipped direct to the paper mills, in Oregon as well as in this State.

This is of poor quality, but there is another locality convenient to transportation, where there are very extensive and practically inexhaustible deposits, of practically pure carbonate of magnesium, fully equal to the best and purest of the Grecian and Styrian imported article. The most favorable deposit covers 160 acres and can be opened by quarry; and there is an abundance of wood for calcining purposes on the ground. It is only 14 miles from a railroad station, with a down grade over a good road, but the owner does not care to go into the business of mining and manufacturing, though he is willing to sell. Freight charges to Wisconsin, or other points as far east as Chicago, are $13 per ton for crude, $15 per ton for calcined; while from the shipping station to San Francisco, it is $2 per ton, with a good demand for an article of this quality.

Being mining engineers, we thought it would be of benefit to many of the readers of your valuable paper to supply the additional information given above.

BANDMANN & ADAMS.

San Francisco, July 30, 1903.

Facts About Peru.

Sir.—Inquiries which reach me, from time to time, show that many erroneous impressions have existed till recently as to Peru (at least in Europe), not merely in regard to the political, financial and economic situation in the Republic, but also in respect of its physical characteristics. Peru is often spoken of as the "Little Republic." Relatively to the United States of North America that is true; but the fact remains that Peru has an area approximately six times that of the United Kingdom of Great Britain and Ireland, or three and a half times that of Germany.

What the Republic needs is more population, the density of which is as 1 to 70 compared with that of Great Britain and Ireland, and as 1 to 60 compared with that of Germany; more industrial and agricultural activity, for which the opportunities are many and immense, and more capital employed in developing the natural riches so plentifully bestowed upon it. The emigrant who needs to choose his climate cannot fail to find in Peru a settlement fitting his requirements at any part of the temperature scale; enterprising manufacturers may find their facilities for the employment of their skill unrivalled in any other State; the capitalist has magnificent opportunities for the investment of his wealth and its profitable employment. Peru also offers exceptional opportunities to scholarly gentlemen, with a little capital, to establish more private colleges and schools for the study of the English language.

Politically considered Peru offers every security which accompanies stability of purpose and a wide franchise; in municipal and taxation matters there is elasticity and—to suit the needs of young industries —generosity, while in respect of personal liberty there are constitutional guarantees unsurpassed for their effectiveness and comprehensiveness.

It would cause me to trespass too much upon your valuable space to justify by chapter and verse these generalizations, but if they excite the interest of some of your readers through your courtesy in giving publicity to this letter, may I also be permitted to say that I shall be happy to forward an up-to-date map and sketch of Peru to any persons who may furnish me with their names and addresses.

Thanking you in anticipation for any assistance you may thus afford to me in making my country better known,

EDUARDO HIGGINSON,
Consul of Peru.

Southampton, England, July 28, 1903.

QUESTIONS AND ANSWERS.

Queries should relate to matters within our special province, such as mining, metallurgy, chemistry, geology, etc.; preference will be given to topics which seem to be of interest to others besides the inquirer. We cannot give professional advice, which should be obtained from a consulting expert, nor can we give advice about mining companies or mining stock. Brief replies to questions will be welcomed from correspondents. While names will not be published, all inquirers must send their names and addresses. Preference will, of course, always be given to questions submitted by subscribers.

The Tropenas Converter.—Can you tell me anything about the Tropenas converter and its uses? I believe it is used chiefly where steel castings are made.—N. M. D.

Answer.—The following practical notes on the Tropenas converter are from an excellent article by Mr. Arthur Simonson, which appeared recently in the Cleveland *Iron Trade Review*: "There have been several small converter processes invented, but the only one that has given commercial satisfaction is the Tropenas process. . . . In any process of making steel in an acid lined furnace, the chemical action is the same, and consists in removing, by oxidation, the bulk of the carbon, silicon and manganese contained in a bath of crude metal introduced into the furnace. The action may be stopped when the desired amount of these elements has been eliminated, leaving the required percentages in the metal, or it may be continued till they are at the lowest limit, after which the exact amount of each is introduced by a weighted final addition. The latter is by far the safest and most accurate method.

"Sulphur and phosphorus are not perceptibly reduced by any of the acid-lined furnaces, despite the claims of some inventors to the contrary, hence it is necessary that in purchasing melting stock these elements should be kept as low as possible. The phosphorus should not exceed 0.035 per cent nor the sulphur 0.030 per cent. in the pig iron. The tendency is for the resulting percentages of sulphur and phosphorus to be slightly higher in the finished steel, on account of the shrinkage in bulk, due to elimination of about two per cent. of silicon, three-quarters of one per cent. of manganese, and three per cent. of carbon, and the oxidation of a small amount of iron.

"This renders these processes unsuitable for the manufacture of high grade tool steel, although, if the melting stock is low enough in sulphur and phosphorus, it can be made readily. Even under ordinary circumstances a fair grade of miner's drill steel and manganese steel can be satisfactorily made.

"In the Tropenas converter, the loss in weight during the blowing process is about 10 per cent. Small converter processes have been criticised adversely on account of this loss, but when it is considered that almost 6 per cent. of this loss is composed of the carbon, silicon and manganese, which have taken the place of fuel and by their combustion raised the temperature of the bath, it cannot be considered as waste, though lost.

"The Tropenas plant consists of a converter lined with silica brick and having two rows of tuyeres placed horizontally through the side of the vessel and extending round a portion only of the circumference. Before commencing the blow, sufficient iron is tapped into a ladle from the cupola and poured into the converter, to bring the level just up to the bottom edge of the lower tuyeres, when the converter is inclined at a small angle to the vertical, making the tuyeres slope down slightly towards the surface of the bath. Blast at a pressure of about 3 lb. is turned on from a positive pressure blower through the lower tuyeres only, the upper ones remaining closed at this stage. The oxidation then commences, and the silicon is eliminated during the first period of the blow, at the same time the carbon being changed from the graphitic to the combined state. When, by the combustion of the silicon, the temperature has been raised to a certain point, the carbon and manganese commence to burn, and it should be so arranged that the initial silicon is not too high, for above a certain temperature the oxygen will combine with the carbon rather than the silicon, and the resulting silicon in the steel will be too high.

"At the point where the carbon-manganese flame makes its appearance, the upper tuyeres are opened at the discretion of the operator to a greater or less degree and by this means the carbon, which is partially consumed by the action of the lower tuyeres, is supplied with supplementary oxygen and completely burned to CO_2, generating more heat, which is absorbed by the steel. This is one of the important features of the Tropenas process and contributes largely to its success, as it makes the steel very hot and fluid. In the second period of the blow, clearly indicated by the flame coming out of the mouth of the converter, the manganese is being rapidly eliminated, in fact, sometimes the gas is generated so rapidly as to cause the bath to appear to boil and projections of small amounts of slag take place at the mouth of the vessel, these being caused by the explosion of the bubbles of gas passing through the slag. By watching the indications at the mouth of the converter, the operator has a very good physical check on the chemical analysis of his cupola mixture; if the carbon flame is too long in making its appearance, the silicon is too high. This time should be only four or five minutes. If the flame comes too soon, the silicon is low, and the blow will probably be less hot than usual. If, in the second period, the blow is dirty, that is, throws out a great many projections, he should look to the manganese for an explanation. During the last period, the carbon is gradually burned out, the flame finally dies down and the blow is finished. To keep the blast on after the flame drops would be to burn the iron and ruin the lining of the converter, but the indications are much too clear to allow of such a mistake being easily made. When the flame falls, the converter is turned down to bring the metal clear away from the tuyeres, the blast is shut off and the final addition of ferro-manganese, spiegel, and so forth, is made, either cold or melted, as the case may be, a skimming device is fixed in the mouth of the converter, and it is then used as a reservoir from which the bull ladles are filled as rapidly as they can be carried away and poured, the converter being fitted with an electric motor and controller for tilting purposes."

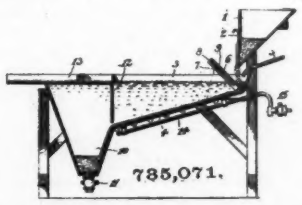
PATENTS RELATING TO MINING AND METALLURGY.

UNITED STATES.

The following is a list of patents relating to mining and metallurgy and kindred subjects, issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the ENGINEERING AND MINING JOURNAL upon the receipt of 25 cents. In ordering specifications correspondents are requested to name the issue of the JOURNAL in which notice of the patent appeared:

Week Ending August 5, 1903.

735,071. EXTRACTION OF ZINC, LEAD AND SILVER SULPHIDES FROM THEIR ORES.—Guillaume D. Delprat, Broken Hill, New South Wales, Australia. The method of separating ores from gangue, which consists in



forming a bath containing nitric acid, feeding finely ground ore thereto, whereby gas-bubbles will be formed on the ore particles to raise them to the surface of the solution, and removing the particles of ore so lifted to the surface.

735,086. APPARATUS FOR HANDLING SLAG.—Hugo J. Glaubitz, Allegheny, Pa. In an apparatus for handling slag, etc., the combination of a stationary runner provided with a series of spouts arranged at intervals along its length, gates controlling said spouts, and an equal number of pivotally-mounted pans arranged to receive the slag from the spouts.

735,098. PROCESS OF OBTAINING LEAD OR OTHER METALS FROM ORES OR MATTES.—Carl Hoepfner, Frankfort-on-the-Main, Germany. A process which consists in leaching substances containing lead, with a solution containing chlorine in a reactive state and a solvent of the chloride of lead, precipating the lead, as a sulphite, thereby recovering the lead as an almost insoluble precipitate.

735,155. FIREPROOF COMPOUND.—Gustaf O. Rosenleaf, Muscatine, Iowa. A composition of matter consisting of equal volumes of sawdust thoroughly moistened with a solution of blue vitriol and a mixture containing sand and cement.

735,222. WELL-DRILLING MACHINE.—William N. Dufford, Findlay, Ohio. In a well-drilling machine, a spudding-rope-receiving drum, a rocking beam fulcrumed adjacent thereto and carrying a sheave disposed, when the machine is in operation, approximately in horizontal alinement with the drum, driving mechanism, a plurality of sheaves supported on the base of the machine, and a flexible power-transmitting element connecting the driving mechanism and the rocking beam.

735,234. QUARTZ-MILL.—John F. Forward, San Diego, Cal. The combination with a base having a non-circular recess, of a grinding member composed of a hollow cone having a frustum-shaped lower end and a non-circular lug extending inwardly from the lower edge thereof, said lug engaging the non-circular recess in the base and connected detachably therewith by means of a fastening member extending through alining perforations in said lug and base.

735,244. PROCESS OF METAL-WELDING.—Hans Goldschmidt, Essen-on-the-Ruhr, Germany, assignor to Clarence B. Schultz, Berlin, Germany. A process for welding metals, consisting in casting molten slag around the meeting faces of the pieces to be welded together, and after the molten slag has formed a protecting coating around the same, casting molten metal around the protecting cover.

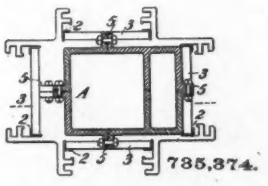
735,272. PROCESS OF MAKING GAS.—William Kent, Passaic, N. J. A process of making gas, which consists in blasting a charge of coal to incandescence, then feeding a fresh supply of coal upon said charge and blowing air directly into the charge itself at points substantially at the top and bottom of the same, and at the same time feeding steam or water into the charge at or near the zone of greatest temperature and withdrawing the gas produced substantially at a point midway of said charge.

735,293. PROCESS OF MAKING ARTICLES OF WOLFRAM AND LEAD.—Eugen Polte, Magdeburg-Sudenburg, Germany.—A process for the production of solid articles from purified wolfram and lead, consisting in forcing together, or intimately compounding, the particles of the metals in a disintegrated, granulated or pulverulent form, and subsequently giving them the desired shape by pressing them.

735,303. METHOD OF MAKING METAL CASTINGS.—Albert Sauveur, Cambridge, Mass.—A method of casting metal, which consists in filling a mold with molten metal and in retarding the cooling of the upper portion of the mass within the mold until the lower portion has cooled by causing the metal to overflow, conducting the overflow into another mold and regulating the cooling of the mass within that mold as before and so on through a series of molds.

735,365. STEEL.—Robert A. Hadfield, Sheffield, England. A process of making steel free from or low in manganese, which consists in decarbonizing and demanganizing iron, and adding thereto a carbonizing agent, chromium and nickel, and a solidifying agent.

735,374. STAMP-MILL MORTAR.—John H. Hendy, San Francisco, Cal. In a stamp battery, a mortar divided vertically into independent sections having abutting flanges; means for detachably uniting said sections as a rigid whole,

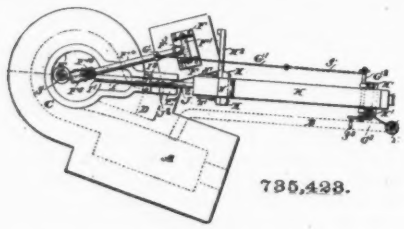


said sections having screen discharge openings; a base detachably secured to the sections and having a central opening; and a die or piece fitting said opening to form a closure and bottom therefor.

735,391. ROLLING-MILL FEED-TABLE.—Julian Kennedy, Pittsburg, Pa. A rolling-mill feed-table having a series of rollers, a case extending along one side of the table and containing a worm-shaft engaging worm-wheels upon the projecting shaft of the rollers, and bearings made in halves extending below the shafts and held against lateral movement by the sides of the case, and capable of longitudinal movement in the case.

735,422. APPARATUS FOR HANDLING COAL FOR GAS PRODUCER PLANTS.—Maximilian M. Suppes, Elyria, Ohio. The combination with a series of bins having a grating extending across their tops of a crane arranged to traverse said bins; unloading tracks and stock-pile being also traversed by the frame, which carries a hoist bucket.

735,423. PYROMETER.—Frederick W. Taylor and Henry L. Gantt, South Bethlehem, Pa., assignors by mesne assignments, to Morse Thermo-Gage Company, Trumansburg, N. Y. An optical pyrometer for gaging the temperature of a substance, comprising a light emitting standard adapted



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to emit light-rays having approximately the color and intensity of the light which would be emitted from said substance when the later is heated to the desired temperature, in combination with a tube through which the color and intensity of the light-rays emitted by the standard and substance are brought simultaneously to the eye of the observer.

735,424. METHOD OF DETERMINING AND REGULATING THE TEMPERATURE OF HEATED ARTICLES OR RECEPTACLES.—Frederick W. Taylor and Henry L. Gantt, South Bethlehem, Pa., assignors, by mesne assignments, to Morse Thermo-Gage Company, Trumansburg, N. Y. A method of gaging the temperature of a substance when heated to incandescence, consisting in comparing the degree of incandescence of said substance with a standard which is incandescent simultaneously therewith and incandescent to a degree corresponding to the incandescence of said substance when heated to the desired temperature.

735,425. PYROMETER.—Frederick W. Taylor and Henry L. Gantt, South Bethlehem, Pa., assignors, by mesne assignments, to Morse Thermo-Gage Company, Trumansburg, N. Y. An optical pyrometer for gaging the temperature of a substance, comprising a light-emitting standard adapted to become incandescent simultaneously with said substance and incandescent to a degree corresponding to the incandescence of said substance when heated to the desired temperature, means for bringing the standard to the said degree of incandescence, in combination with a tube through which the substance and standard may be simultaneously viewed.

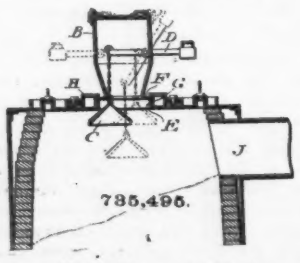
735,462. CONTINUOUS KILN.—William A. Butler, San Francisco, Cal. A continuous kiln, with combustion chambers extending lengthwise below the kiln floor, in which fuel is burned in suspension, opening into the kiln, parallel with and between the kiln walls, combined with fuel pipes extending across and below the kiln-floor, and connecting the burners in the said combustion chambers.

735,464. ELECTROLYTIC DIAPHRAGM.—Eugene A. Byrnes, Washington, D. C. An electrolytic diaphragm, consisting of a body of an electrically-conductive material so subdivided or broken up by passages extending through it that it does not conduct as a body and therefore will not act as an electrode.

735,476. METHOD OF PRESSING PEAT-BLOCKS.—Alexander Dobson, Beaverton, Canada. A method of forming peat-blocks, consisting in compressing a quantity of peat to a suitable degree against a fixed resistance, then allowing the air to escape, then compressing a further quantity of peat on top of the block so formed and a fixed resistance beneath it, so as to further compress the lower block, then removing the compression from the last partially compressed block above and allowing the air to escape and periodically removing the lower block after the second compression and so on continuously.

735,492. GAS-PRODUCER.—John W. Gayner, Salem, N. J., assignor to American Producer-Gas Furnace Company. A conduit for conveying gas from a gas-producer, consisting of substantially horizontal angular sections having openings at their ends, the bottoms of said sections extending to said openings, whereby a scraper can be inserted to scrape the accumulations within said sections to and through said openings.

735,495. GAS-PRODUCER.—John W. Gayner, Salem, N. J., assignor to American Producer-Gas Furnace Company. A



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gas-producer provided with a rotatable hopper, and a deflecting valve attached to said hopper and adapted to divert the fuel to different parts of the gas-producer.

735,493. GAS-PRODUCER.—John W. Gayner, Salem, N. J., assignor to American Producer-Gas Furnace Company. A conduit for conveying gas from gas-producers, consisting of longitudinal sections connected at their adjacent ends by transverse sections, said sections being provided with outlet openings, and independent means in said sections for conveying the accumulations therein to said outlet openings.

735,494. GAS-PRODUCER.—John W. Gayner, Salem, N. J., assignor to American Producer-Gas Furnace Company. A conduit for conveying gas from a gas-producer, consisting of horizontal angular sections forming a continuous conduit, said sections being provided with outlet openings, and independent means in each section for conveying the accumulations to said outlet openings.

735,501. PROCESS OF EXTRACTING GOLD AND SILVER FROM ORES.—Charles A. Harp and John F. Starkweather, Sr., Stockton, Cal., assignors of one-half to George Marks, Sacramento, Cal., and Ben Davis, W. A. Morris and John F. Starkweather, Jr., Stockton, Cal. A process of treating ores containing precious metal, which consists in pulverizing the ores in the degree above described, adding thereto kaolin, brickdust, unburned limestone, sawdust and charcoal in substantially the proportions hereinbefore stated, agitating the mass and subjecting the same to a proper degree of heat, and when the above named added ingredients have performed their functions, then adding saltpeter.

735,512. TREATMENT OF ORES CONTAINING GOLD, SILVER, COPPER, NICKEL AND ZINC. — Henry Hirsching, San Francisco, Cal. A process of treating roasted ores and tailings, which consists in washing with water, leaching with ammonia, or ammonium sulphate, chloride or nitrate, adding water or wash-water, or boiled-out solution obtained by the operation of the process, and recovering therefrom the metal or metals separately and the ammonia.

735,520. WEDGE OR SPLITTING-TOOL FOR COAL MINING OR OTHER PURPOSES.—Alexandre Ivanoff, Charkoff, Russia. The combination of a split part formed with an internal socket, a wedge arranged in said split part and adapted to spread the members thereof, a threaded part controlling said wedge, and another threaded part engaged by the threading of said first named threaded part, said other threaded part being inclosed in said socket and secured thereby against movement longitudinally of the split part.

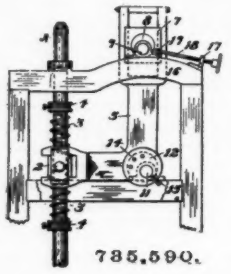
725,522. LAND-DREDGE.—William W. Jones, Toledo, Ohio. The combination of a land-dredge, having thereunder longitudinal fixed foundation shoes, longitudinal movable shoe contiguous thereto, and means for raising and causing the movable shoes to travel forward while the dredge is at rest, means for raising the dredge upon said movable shoes, and causing it to travel forward while said movable shoes are at rest.

735,528. MANUFACTURE OF BRICKS FOR FURNACES.—James E. Kirkpatrick, Taunton, England. The manufacture of bricks and composition capable of withstanding very high temperatures from crude magnesite of a high degree of purity, such as that found in many parts of Southern India, by the following process: First, dead-burning the magnesite to free it from carbon dioxide and any other volatile or organic impurities it may contain; second, crushing the dead-burnt magnesite to powder; third, exposing the crushed dead-burnt magnesite to the atmosphere and frequently turning it over; fourth, mixing the crushed dead-burnt magnesite after exposure to the air with a small proportion of its weight of borax; fifth, adding only sufficient water to the material to enable it to be conveniently handled in a mass; sixth, molding the mass to the required shape; seventh, drying the molded mass; and, eighth, burning the dried molded mass at a high temperature.

735,549. SUCTION VALVE FOR COMPRESSORS.—Ernest A. Menking, Pittsburg, Pa. A valve structure for compressors and the like, comprising an internally threaded ring having a valve seat, a valve having a stem provided with a head, an inclosing cage constructed of substantially semicylindrical sections, each formed externally with semicylindrical projections, which are flush with said ring, and each also having a semicylindrical internal extension, the two latter uniting to form a guide for the stem, a spring surrounding the guide, said guide having recessed portions constituting a bearing for one end of the spring, and a bearing for the other end of said spring, adapted to be applied over said head, said cage-sections having another internally threaded ring surrounding the same adjacent the head, and each section having a semicylindrical threaded extension at each end to receive said first named ring and the ring last named.

735,578. MINER'S CANDLESTICK.—Samuel Peterson and Cornelius E. Fielding, Grant's Pass, Ore. In a miner's candlestick, the combination of a handle formed with a pair of parallel jaws and an enlarging yoke connecting the rear ends of said jaws, a pair of supporting devices pivoted between the outer or forward ends of the said jaws, a locking-bolt mounted in said jaws and extending through concentric slots in the supporting devices, means whereby said bolt is adapted to lock the supporting devices in either their folded or extended positions, and means for rotating said bolt to lock or unlock the said supporting devices.

735,590. STAMP-MILL.—George C. Richards, Berkeley, Cal. The combination with a vertically guided and movable stamp-stem and a tappet slidable thereon, of a lifting-stop fixed to the stamp-stem and a compressible spring below, said spring having one end secured to the tappet and the other contacting with the stop, and means for recipro-



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cating the tappet whereby alternate compression and elongation of the spring, and lifting of the stamp-stem, serves to rotate the stamp and stem.

735,594. MANUFACTURE OF REFRACTORY MATERIAL.—Alfred G. Salamon, London, and Percy Williams, Rochester, England, assignors to the British Uralite Company, Limited, London, England. In a process for the manufacture of refractory substances from material treated with a solution of sodium silicate and with a solution of sodium bicarbonate, the steps of soaking the treated material in a solution of calcium chloride, and then heating the same.

735,596. METHOD OF CASTING INGOTS.—Albert Sauveur, Cambridge, and Jasper Whiting, Lexington, Mass. A method of casting ingots, consisting in pouring into the first of a series of molds, allowing it to overflow into a predetermined number of succeeding molds, then pouring into another previously-filled mold and allowing the metal to continue to overflow the molds before filled, until the next mold beyond them is filled, and so on.

735,615. INGOT-STRIPPER.—Levi G. Stitt, Vandergift, Pa. An ingot extracting device, comprising means for engaging the mold and lifting the same, mechanism operated by the weight of the mold and ingot and arranged to engage the ingot and force it out of the mold, and a lever arranged to disengage the mold-engaging means from the mold.

735,616. INGOT-MOLD DOG OR GRAPPLER.—Levi G. Stitt, Vandergrift, Pa. An ingot mold lifting device comprising a frame or casing adapted for connection to a crane or other lifting mechanism and provided with a guiding projection at its lower end adapted to pass through the neck of the mold, and means on said frame or casing arranged to engage the interior of the mold and lift the same.

735,666. CHROMIUM-NICKEL STEEL.—Robert A. Hadfield, Sheffield, England. A steel low in manganese, containing not more than 0.2 per cent. thereof, and capable of being hardened in the mass, and containing not more than 1.75 per cent. carbon, chromium up to 5 per cent., and nickel up to 7 per cent.

GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

Week Ending July 11, 1903.

13,614 of 1902. SEPARATING IRON FROM DROSS.—G. A. Dick, London. Method of separating out fragments of iron from dross in galvanizing works by melting the dross and straining off.

14,771 of 1902. PURIFYING BLAST-FURNACE GASES.—B. H. Thwaite, London. Separating dust from blast furnace gases by passing through a centrifugal machine in which the heavier particles are thrown against a stream of tar.

16,215 of 1902. REFRACTORY MATERIAL.—H. A. D. Collins, Glyn Neath. A refractory material consisting of a double silicate of lime and sodium produced by burning together 90 parts of silica, 2 parts of caustic soda and 8 parts of milk of lime.

16,358 of 1902. ELECTROLYTIC CATHODES.—L. Gurwitsch, St. Petersburg, Russia. Making mercury cathodes for electrolytic cells for the decomposition of salt, by dipping iron gauze into zinc amalgam, which adheres tightly to the gauze and fills up the space.

16,723 of 1902. SAVING ZINC FUMES.—R. W. Western, London. Catching zinc fumes by agitation in a solution of sulphate of ammonia and precipitating as zinc hydroxide by addition of aqueous ammonia.

7,296 of 1903. ROCK DRILL PISTON.—R. Meyer, Muhlheim-on-Rhine, Germany. Mechanism for checking the piston of reciprocating rock drill, so as to prevent it knocking the front end of the cylinder in case the drill does not come in contact with the rock.

9,087 of 1903. COKE OVEN.—G. Wolters, Dortmund, Germany. Improvements on coke ovens having alternately operated regenerators for heating the air supply for combustion of the gases.

TO TRAVELING ENGINEERS.

A room for the exclusive use of visiting engineers is maintained at the New York office of THE ENGINEERING AND MINING JOURNAL. Visitors to the metropolis are cordially invited to take advantage of the facilities it offers, by having their mail addressed in care of the JOURNAL and making its office their headquarters. The managers of the branch offices will also be glad to welcome visiting engineers and to be of any service to them that they can.

We are informed that the Institution of Mining and Metallurgy offers to all members of the American Institute of Mining Engineers non-resident in Great Britain, the privilege of free use of the Institution offices and library at Salisbury House, London Wall, E. C. Visiting engineers may have their letters addressed to the offices of the Institution and thus enjoy the advantages of temporary office accommodation in the city of London.

PERSONAL.

Mining and metallurgical engineers are invited to keep THE JOURNAL informed of their movements and appointments.

Mr. William B. Farish is at Los Angeles, Cal.

Mr. F. L. Bosqui is in Okanogan County, Wash.

Mr. H. L. Frank has left Europe for Butte, Mont.

Mr. A. C. Beatty, of Denver, is expected in New York.

Mr. Thos. F. Cole has been visiting Wyoming copper mines.

Mr. Carl Henrich, of New York, has gone to Guanajuato, Mex.

Mr. Robt. J. Coleman, of Denver, has gone to Salt Lake City.

Mr. J. C. A. Henderson has returned to London from South Africa.

Mr. Henry Fox, Jr., of Beatrice, Neb., has been in Gilpin County, Colo.

Mr. Frank Klepetko has left Parral, Mex., and is now at El Paso, Texas.

Mr. Jas. Holman, of Camborne, Cornwall, has returned from South Africa.

Col. F. L. Wiswall, of Denver, has taken up his residence at Salt Lake City.

Mr. J. C. Buckbee, of the Allis-Chalmers Company, recently visited Greenwood, B. C.

Mr. Harry R. Hall, of the Pittsburg Reduction Company, was in New York last week.

Mr. George C. Gill, president of the Shannon Copper Company, is at Holyoke, Mass.

Mr. A. S. Dwight has returned to Cananea, Mex., from his visit to Rio Tinto, Spain.

Mr. Robert T. Hill is due to arrive at New York per steamer *Campania*, on August 15.

Capt. William Daniell, of Calumet, Mich., has left for the Algoma District, Ontario, Can.

Mr. J. Dunraven Young, of Chicago, has left for Washington and the Kootenay District.

Dr. H. E. Smith, dean of the faculty of Yale College, has been in Sumpter, Ore., for several days.

Judge McFarland, of Pittsburg, Pa., has been visiting the Phoenix District of Gilpin County, Colo.

Mr. W. G. Swart, of Denver, has returned to Colorado after four weeks' absence at Benton, Wis.

Dr. Robert Bell, of Ottawa, Can., has gone to Vienna, Austria, to attend the Geological Congress.

Mr. George C. Moore, of Central City, Colo., has gone to Alaska with his family, on a pleasure trip.

Mr. Forbes Rickard, of Denver, has gone to Guadaloupe y Calvo, Chihuahua, and will also visit Parral.

Mr. Arthur Goodall is manager of the Fremont Consolidated Mining Company, at Amador City, Cal.

Mr W. A. C. Pape, formerly of El Paso, Tex., has opened a custom assay office at Torreon, Coahuila, Mex.

Mr. Harrington Blauvelt will superintend the new operations at the Monte Cristo Mine, at Groom Creek, Ariz.

Mr. Nathan Hirsch, of New York City, has been at the Gold Run Mine on South Boulder Creek, Colorado.

Mr. H. C. Morgan, of Cuba, N. Y., and Mr A. M. Wellman, of Friendship, N. Y., are at Telluride, Colo.

Mr. G. D. Patterson, of Omaha, Neb., has been visiting the Yankee District of Clear Creek County, Colo.

Mr. Simon Bamberger and Mr. J. D. Wood returned to Salt Lake recently from a trip to California.

Mr. Geo. Mitchell, of New York and Los Angeles, has returned from an extended journey through Alaska.

Mr. Frank Oldfield has accepted an appointment as assistant manager of the Zaruma gold mines, Ecuador.

Mr. E. McCormick, of Calumet, Mich., and Durango, Mex., is examining mines in Colorado and Montana.

Mr. Max. Elftman, of Brownsville, Cal., is examining some placer deposits near Port Orford, Southwest Oregon.

Mr. J. E. Beveridge, of Salt Lake, has been appointed superintendent of the Century Mine in Park Valley, Utah.

Mr. Edgar S. Cook, President of the Warwick Iron Company, Pottstown, Pa., sails per steamer *Mesabi*, on August 15.

Mr. F. F. Archibald, of the Tharsis Copper Company, has been examining the mines of the Clifton District, Arizona.

Mr. W. H. Adams has gone to the Seven Devils District, in Idaho, to direct the construction of a smelter at Homestead.

Mr. Edward G. Stoiber was recently at Shanghai, China; he is on his way to Europe by way of the Trans-Siberian Railroad.

Mr. P. M. Collins has resigned as superintendent of the mill of the Portland Gold Mining Company, near Cripple Creek, Colo.

Mr. William Fleet Robertson, provincial mineralogist for British Columbia, recently visited parts of the East Kootenay District.

Mr. Chas. Kirchhoff, editor of *The Iron Age*, is leaving for London on a well-earned holiday, by the *Mesabi*, sailing on August 15.

Mr. R. K. Cameron, of Chicago, representing the Allis-Chalmers Company, is in the Poplar Creek gold fields, above Kaslo, B. C.

Mr. R. W. Rodda, of Seattle, Wash., has been in the Lillooet River country, B. C. He expected to be at Seattle by August 14.

Mr. Theodore Dwight, assistant secretary of the American Institute of Mining Engineers, sails for London on the *Mesabi* on August 15.

Mr. J. Parke Channing has gone from Parral, Mexico, to Calumet, Mich. He will attend the meeting of the Lake Superior Mining Institute.

Mr. W. S. Thyng has resigned as professor of mining at the Washington State College, at Pullman, Wash., to engage in consulting work at Spokane.

Mr. David P. Davies, superintendent of the Marinette Iron Works, Marinette, Wis., has resigned to accept a position with the Allis-Chalmers Company.

Mr. Henry Brelich is general manager of the Anglo-French quicksilver concessions in the Kwei-Chau Province, China. He left London for the mines last week.

Mr. J. L. Geroux, superintendent of the United Verde Mine, at Jerome, Ariz., has resigned, but his resignation will not become effective for several months.

Dr. A. H. Elftman has returned from Thunder Mountain, Idaho. He is now in the Black Hills, S. D., and will be at Silverton, Colo., the last week in August.

Mr. A. F. Wuensch, of Denver, is at Albuquerque, N. M., directing the installation of a plant on the Milagros Mine. From there he will go to Eldorado County, Cal.

Mr. W. D. Crawford, superintendent and general manager of the Tidewater Steel Company, has resigned to become general manager of the LaBelle Iron Works, at Steubenville, O.

Dr. H. Aldred, of Philadelphia, Pa., has been visiting Central City, Colo., as the guest of Manager Henry I. Seemann, of the Yankee Consolidated Company, at Lombard.

Mr. R. Roscoe Leslie has resigned as superintendent of the Le Roi Mine. Mr. Robert H. Anderson, general manager of the B. C. and Oro Denoro mines, at Summit Camp, succeeds him September 1.

Mr. F. B. F. Rhodes has resigned as superintendent of the National plant of the American Smelting and Refining Company, at South Chicago. He erected these works 13 years ago, and has been in charge until now.

Mr. W. A. Kissam, of New York, president of the South American Development Company, accompanied by Mr. J. W. Mercer, the general manager of that company, passed through Denver last week on their way to Montana and the Pacific Coast.

Mr. Garry B. LeVan, superintendent of the Haselton furnace of the Republic Iron and Steel Company, has been placed in charge of the Atlantic stack of the company at New Castle, Pa. Mr. Bert Deetrick, superintendent of the Hannah furnace, will also have charge of the Haselton furnace.

SOCIETIES AND TECHNICAL SCHOOLS.

UNIVERSITY OF COLORADO.—A new wing is being added to the engineering building, with additional equipment, and also largely increased space and equipment provided for the physical and chemical laboratories.

BROWN UNIVERSITY.—Appointments have been made as follows: Arthur H. Blanchard, assistant professor of civil engineering; Dr. Michael X. Sullivan, instructor in chemical physiology; J. Ansell Brooks, instructor in drawing.

PURDUE UNIVERSITY.—Eugene W. Kerr has been appointed instructor in machine design. He graduated from the Texas Agricultural and Mechanical College in 1896, and later took a course in experimental engineering at Stevens Institute of Technology at Hoboken, N. J. He resigns the position of assistant professor of mechanical engineering in the Texas Agricultural and Mechanical College to go to Purdue. He is the author of a text book on "Power and Power Transmission."

INDUSTRIAL.

The Mohawk Mine, in Michigan, has let a contract to the Ingersoll-Sergeant Drill Company for a 60-drill air compressor.

The Colorado Iron Works, of Denver, is shipping furnaces and machinery for the smelter of the Cataract Copper Mining Company of Basin, Mont.

The Mine and Smelter Supply Company of Denver has sold a complete mining plant, consisting of engine, boilers, pumps, etc., to Thomas Riley, Pearl, Colo.

Blast furnace D, of the Colorado Fuel and Iron Company, at Pueblo, has gone out for repairs. Furnace A is being relined. Only three furnaces, B, C and E, are working.

The Tezuitlan Copper Company, mines in the Tezuitlan District, Mexico, is to extend its hydraulic plant. The Pelton Water Wheel Company, of New York, is figuring on a water wheel.

The Jeanesville Iron Works Company, of Jeanesville, Pa., through its Denver branch, has delivered to the Ajax Gold Mining Company, of Victor, Colo., a compound condensing pump, to be installed on the 1,100-ft. level.

It is stated that eastern men, headed by Benjamin Guggenheim, of New York, have secured a large block of the stock of the Holthoff Machinery Company, of Cudahy, Wis., manufacturing mining, milling and special machinery.

The Henry S. Mould Company will soon have completed the briquetting plant which it is erecting for the Jones & Laughlin Steel Company, at the Eliza blast furnace plant at Pittsburg, Pa. The plant will briquette fine dust and fine ores.

At the recent annual meeting of the stockholders of the Knoxville Iron Company, Knoxville, Tenn., all the directors were re-elected. The directors elected the following officers: president, W. P. Chamberlain; vice-president, T. J. Stephenson; secretary and treasurer, O. A. Brown.

The Allis-Chalmers Company, of Chicago, is now at work on an 800 h. p. combined vertical and horizontal four cylinder triple expansion engine for the Homestake Company, at Lead, S. Dak. An additional contract calls for three Sederholm boilers, each with a capacity of 320 h. p.

The Boviard & Seyfang Manufacturing Company, of Bradford, Pa., in addition to making oil well drilling tools, is to erect a machine shop and foundry for the manufacture of steam and gas engines, air compressors and gas pumping machinery. The company is in the market to purchase all the machinery necessary.

Messrs. E. P. Roberts & Co., consulting engineers, of Cleveland, O., have opened a department of cement engineering and will take entire charge of designing the construction and supervising the operation of cement plants. Mr. George S. Perkins has been secured to look after this work. He is a graduate of Stevens Institute of Technology, and has had experience in designing and constructing cement plants.

The La Follette Coal, Iron and Railway Company, of La Follette, Tenn., states that its furnace, contrary to a newspaper report, has not been banked since it started on September 25, 1902. The new blowing engine, erected by the Wm. Tod Company, of Youngstown, O., is expected to be in operation by September 1, and the new stove, 18 by 90 ft., the fourth to be installed, is expected to be ready by October 10. The stove is being erected by the W. B. Pollock Company, of Youngstown, O.

The C. O. Bartlett & Snow Company, of Cleveland, O., announces that at considerable expense it has erected at its works a Triumph steam dryer and a direct heat rotary dryer, and will be glad to make very careful test runs, drying any kind of material, either

by steam or direct heat, for intended purchasers, under certain conditions. The company will make no charge for use of dryer or power and will charge only actual cost for labor required for handling the material to be dried. Shipments may be 500 lbs. or a car load.

The Helena Light and Traction Company is building a new power house at Helena, Mont., which will be equipped with Westinghouse apparatus throughout. The electrical equipment consists of two 75-kw., direct-current generators, each to be direct coupled to a 100 h. p. type C induction motor; two 15 h. p. motor-generator sets, nine 10,000 volt transformers, six of 150-kw. and three of 125-kw. capacity; also two 175-kw. rotaries. Three 150-kw. and three 125-kw. transformers will be equipped with a face plate for obtaining different voltages from the transformers, this dial being connected to the low tension circuit in such a manner as to give variation of voltage between 2,400 and 2,500. Seventeen low tension leads are brought out from the secondary winding, one lead directly connected into the line and another lead connected to the spark gap, the remaining 15 connected to the regulator face plate outside of the transformer case. This allows the purchaser to secure proper voltage regulation for extreme variation in load without changing the voltage at the Missouri River Company's station, 14 miles distant.

TRADE CATALOGUES.

The D. M. Steward Manufacturing Company, of Chattanooga, Tenn., has issued a descriptive price-list of Steward's metal workers' crayons and pencils. These crayons are intended for marking on rough iron or other metal. The material is stated to be carefully selected and the mark will not disappear when the iron used is heated.

Owners of stamp mills, and stamp mill superintendents will be interested in the illustrated price list of Wilson forged steel shoes and dies sent out by the Western Forge Company, of St. Louis, Mo. The company states that it was the originator of forged steel shoes and dies, and that its products are made from special high-grade steel billets. The pamphlet contains testimonial letters from a number of prominent gold mining companies.

The Wilgus Manufacturing Company, of San Francisco, Cal., sends out a folder describing the Wilgus steam oil burner and the Wilgus automatic regulator. The company states that the regulator is simple in construction and effectively prevents an irregular fire, dangerous to boiler tubes or shell. The Wilgus burner, which has been in use since 1898, is said to be compact, simple and quickly adjustable, and to give a broad, fan-shaped sheet of flame, yielding intense heat without injury to the boiler.

A little bulletin published by the D'Olier Engineering Company, of Philadelphia, Pa., describes steam and electric turbine pumps, particularly units consisting of a steam turbine and a turbine pump mounted on a common base and direct-connected by flexible coupling. These units, manufactured by the De Laval Steam Turbine Company, are stated to be unequalled in economy and efficiency. For high-pressure service the pumps are used in series; one coupled direct to the steam turbine shaft, the other to a shaft geared to lower speed. The company states that with these pumps heads as high as 550 ft. may be obtained and recommends them for water works, hydraulic elevators and all high-pressure service.

Catalogue B, issued by the Blaisdell Company, of Los Angeles, Cal., describes Blaisdell cyanide vat machinery, including the Blaisdell excavators, distributors and aerators. The excavators consist of a movable steel truss bridge, with a central revolving shaft supporting four horizontal steel arms carrying vertical brackets on which are dish-shaped steel disks. The arms are made to revolve by an electric motor and gear train and the discs move the sand. The excavator is made for either top or bottom discharge vats. The Blaisdell vat distributors are of several forms, to suit tank distributors and varying treatments. The aerator is intended to thoroughly aerate the sand or slimes during the transfer from one vat to another and is for plants where a double or triple cyanide treatment is required, or where the ore carries sulphides. A 12-ft. machine is stated to have a capacity of 200 tons of sand per hour

SPECIAL CORRESPONDENCE.

Denver. Aug. 8.

(From Our Special Correspondent.)

With a fair fall season it is estimated that the output of gold from the Colorado mines this year should approach, if not reach, $70,000,000, of which Cripple Creek may be expected to contribute nearly two-thirds.

At the plants of the American Smelting and Refining Company, in Denver, work has been resumed at the Globe plant to the extent of one furnace, and others will be blown in as rapidly as possible. Work will not be resumed at the Grant plant, as it has been closed indefinitely, commercial conditions being unfavorable. It is said that the Western Federation of Miners has not paid the striking smeltermen in Denver the $1 per day promised them. There has been no interruption to operations at the Argo Smelter of the Boston & Colorado Smelting Company.

On August 5 Joseph Scott, found guilty of contempt of court in threatening workmen at the Globe Smelter, was sentenced by Judge N. Walter Dixon, of the District Court, Denver, to two months' imprisonment. The case was appealed to the Supreme Court, where an attempt will be made to show that Judge Dixon went outside his jurisdiction in granting the original injunction, which restrained all members of unions and their sympathizers from interfering in any way with employees at the smelters.

The 14 officers and prominent members of the Idaho Springs Miners' Union expelled from Idaho Springs July 29 by the Citizens' Protective League, are still in Denver and so far have made no attempt to return. The suspects arrested at Idaho Springs and Georgetown charged with complicity in the dynamiting at the Sun & Moon Mine are awaiting trial. The legal advisers of the Citizens' Alliance of Denver are cooperating with the legal advisers of the Citizens' Protective League of Idaho Springs and the local authorities, looking to the apprehension and conviction of the guilty parties. J. E. Chandler, the financial secretary of the Idaho Springs Miners' Union, who is wanted on charges of arson and conspiracy, has been hiding in Denver, and, so far, has not been apprehended. The officials of the Western Federation of Miners at headquarters in Denver, while making a pretence of willingness to send the union members who are wanted by the county authorities, back to Idaho Springs, do not disclose Chandler's hiding place.

On July 5 John Conn, one of the men indicted by the Grand Jury of San Miguel County for murder in connection with the labor troubles at the Smuggler-Union Mines, near Telluride, was arrested and jailed at Telluride. After Judge Stevens quashed the original indictments, on technical grounds, three months ago, Conn and the other indicted union miners, including St. John, the president of the local miners' union, left the town under cover of night. The evidence against Conn was not so serious as that against some of the others, and it is generally believed that Conn was sent back to see what the local authorities would do. He will be tried at the next term of court. It is said that every effort is being made to locate the other fugitives from justice, including St. John, the president of the local miners' union.

Labor troubles are becoming acute. On August 11 2,500 Cripple Creek miners were called out by the Western Federation of Miners in a sympathetic strike in support of the men who have been on strike at the Denver smelters of the American Smelting and Refining Company and at the Standard Mill of the United States Reduction and Refining Company at Georgetown. Judge Frank Owers, of the District Court, sitting in the absence of Judge De France, has issued an injunction against the Idaho Springs Citizens' Alliance, enjoining its members from preventing the miners expelled for suspected complicity in dynamiting from returning, and issued warrants against members of the league, 42 of whom have already been arrested and held for trial in December. Six of the miners who were expelled returned and were arrested, charged with complicity in dynamiting.

Excitement continues at the recent gold discovery near Waunita, in the eastern part of Gunnison County. The camp has been named Bowerman, after the discoverer. It is claimed that other gold-bearing veins are being disclosed and that hundreds of claims have been located. Not only assessment work is done, but also actual development on various properties, and the outlook is said to be encouraging.

San Francisco. Aug. 5.

(From Our Special Correspondent.)

The assessors in Sacramento County have greatly increased the assessed valuation of certain vineyard and grazing lands because they are now or will be used for mining, including the great Natoma vineyard, near Folsom. The land east of Folsom along Blue Ravine, for 50 years used as farming and grazing land, is now partly occupied by the Blue Ravine, Gray Wing and other productive mining companies who are drifting out the underlying gravel at a depth of about 80 ft. on bed rock. The surface is still used for grazing, etc., but the assessor raised values all along the line. A new ditch built by the North Fork Company also contributed to the increase of the assessment of the county. A number of dredgers are working or being built to work along the American River at places where former methods would not pay.

The assessment roll of Trinity County shows that there are 1,261 gold mines, 20 quicksilver mines and 41 copper mines in the county. Only one of its quicksilver mines is producing, but most of the gold mines, gravel and quartz, are worked. The copper mines are thus far mainly prospects.

The famous old Spring Valley drift mine at Cherokee, Butte County, after an idleness of many years, is to be reopened. It yielded much coarse gold and some diamonds, a few of commercial value. This mine was sold in 1878 for $800,000. The new owners think there are large bodies of auriferous gravel still left. The old Gold Bank Mine at Forbestown, in the same county, closed down some months since, is to be operated again by its former superintendent. Should the Gold Bank tunnel, now in 2,300 ft., be continued through the mountain it would open up a number of mines and do away with hoisting expenses, while a greater head of water with more power at the mouth of the tunnel would result. It is estimated that it will cost about $300,000 more to run the tunnel.

Near Forest Home, Amador County, there are some hundreds of thousands of tons of tailings from the Plymouth Consolidated mills, which have been accumulating many years. They are said to assay from $2 to $3 per ton, and an extensive cyanide plant is being put up to work them.

A vice-president of the Western Federation of Miners has been active of late in Amador County, especially at Amador City, where the Bunker Hill, Fremont Consolidated, Consolidated South Spring Hill and Keystone Consolidated mines are situated, so that labor troubles are again expected. Notices have been posted at Jackson and other places calling for a meeting to organize engineers, millmen and mechanics as a union under the jurisdiction of the Western Federation.

Los Angeles has given up the idea of trying to get the American Mining Congress to meet in that city in 1904. It seems that the officials of the St. Louis Fair wanted the congress in 1904 and the Los Angeles committee gave way to St. Louis, with the understanding that St. Louis people should help them get the congress for 1905.

The State Mineralogist has men gathering specimens for the St. Louis exhibit, but in Northern California mine owners who have been doing this sort of thing for 30 years or more are somewhat apathetic, while in the south, where mining is a comparatively new feature, it is easier to get up mineral exhibits. The California Commission, with about $125,000 to spend on an exhibit, has not yet told the State Mineralogist how much of this is to be set aside for the mining division. A good part of the appropriation will probably be set aside for a California building and when all other interests are considered it will be surprising if mining gets much more than $5,000 or $10,000 as a whole.

The United States Census, the United States Geological Survey and the United States Mint are each obtaining a careful account of the mining industry in California. Men from the Census department are visiting every mine in the State to obtain statistics of development, labor, costs, capital stock, etc. Both the Survey and the Mint are obtaining figures of production, the Mine confining itself to gold and silver, and the Survey taking up copper, quicksilver, borax, coal and all minor minerals as well. No more careful investigation of this subject has ever before been made in California. Men are working in Oregon, Washington and Nevada on the same plan.

The secretary of the Monterey Gold Mining Company has been hauled before the courts for irregularities charged by a stockholder, but has been released on $2,000 cash bail. The property is in Los Burros District, Monterey County. Mack T. Hardee, who brought the suit, states that he, J. W. Van Wilkie and J. A. Reed were jointly interested in some claims at Los Burros and the man now sued was secretary and treasurer of the Pacific States Mining and Investment Company. He agreed to organize another company to work the Monterey mines. The company was organized with Hardee as president and the other man as secretary. Now Hardee declares that the secretary destroyed certain papers, changed the records and did other acts not to his—Hardee's—interest. The case is still pending.

Victoria, B. C. Aug. 4.

(From Our Special Correspondent.)

The silver-lead operators in the Slocan held a meeting during the week to perfect their organization. Among other matters they discussed the question of inducing producers to pool outputs from the mines, with a view to marketing the ores more advantageously than by dealing individually with the smelters. Ultimately it was proposed to appoint a committee authorized to enter into contracts with Canadian or American smelters, offering the best rates. The intention of the mine owners is to watch the home smelters closely and prevent any attempt at taking undue advantage of the terms under which the lead bounty is offered.

According to a local paper James Cronin, manager of the St. Eugene Mine, at Moyie, has said that

the St. Eugene will start work as soon as he makes contracts for its ore. The company may put in an engine to run the mill during low water and intends to save the zinc, which has heretofore been lost in the tailings, by the addition of jigs and vanners to the concentrator. Since shipping was suspended, a considerable sum has been spent in developing the property and the reserves have been considerably increased.

From Ymir District this year the tonnage so far put out is reported as around 30,000 tons. The Ymir Mine continues the heaviest producer. The Porto Rico, owned by a London company, is to be worked again, it is said, having been leased to the former superintendent of the Ymir Mine. The Porto Rico is already equipped with a 10-stamp mill and other machinery. Other mines actively worked in the near vicinity are the Fern and Second Relief.

Shipments from Rossland continue to show an increase. The explanation given for closing the Velvet is that transportation facilities are too poor, but the Rossland *Miner* says that should it be decided to reopen the mine at once, a considerable time would naturally be devoted to opening new ore bodies.

W. S. Gage, representing the Mitchell Mining Company, is credited with some very optimistic statements on the Britannia Mine at Howe Sound, which he recently examined, going so far as to call it the greatest copper property in the world. Mr. Gage was accompanied by A. A. Brownlee, a mining engineer who represents F. August Heinze. The survey for the line of the aerial tramway has started.

San Luis Potosi, Mex. Aug. 4.

(*From Our Special Correspondent.*)

The first lot of Boer settlers has reached Chihuahua. It is understood from leading officials of the Jesus Maria Mine of Bagueriachic, which has a production close to $1,000,000 Mexican per month, that arrangements have been made for the sale to an American company for $10,000,000, Mexican. Some eight miles from Jesus Maria the Realitos property of 40 pertinencias, in San Andres del Rio, is reported bonded by Henry S. McKay for $2,000,000 gold, for the United Mexican Mining and Exploration Company, of which H. E. Carey, of Salt Lake, is promoter. If the deal gets through it is contemplated to erect on the Rio del Fuerte, four miles distant, a 20-stamp cyanide mill, with a railroad between the mine and mill. A concession has been granted the company to dam the river, from which it is estimated about 3,000 to 5,000 h. p. can be obtained. At Ocampa it is reported that W. P. Dunham, of Los Angeles, and Colorado men are after the Pinos Altos mines. T. E. Buffington, of Detroit, is examining properties in the Santa Eulalia District. In the mines of the Santa Eulalia Mining Company a large new body of ore has been opened. Another strike is also reported from Cusihuiniachic. The San Diego Mine of J. C. Brooks, of Santa Barbara, is developing up remarkably well and work has commenced on El Potosi mine, near La Descubridora.

The Pittsburg-San Jose Reduction and Railway Company, which has in the last year built 17 miles of railroad in the Gavilana District, from its reduction works at San Jose del Sitio to the mines of Vallecillo, under direction of M. B. Place, vice-president and general manager, is seeking the aid of New York people for an extension south 60 miles through the rich mineral country of the Sierra Madres, to connect with the Mexican Central and the Parral & Durango railroads, and north to Bocoyna to connect with the Kansas City, Mexico & Orient Railroad. The Rio Grande, Sierra Madre and Pacific Railroad, which has now 250 kilometers from El Paso to Terrazas, is contemplating an extension, 177 miles, to connect with Kansas City, Mexico & Orient at Minaca.

In Durango, the Avino Mines Company, of London, and the San Luis Mining Company, at Panuco del Coronado, are both shipping to the Aguas Calientes plant of the American Smelting and Refining Company and arranging with the International Railroad to build a 10-mile spur from the main line to the mine. At El Cobre, near Trinidad, Messrs. Cushing and Walkup are erecting a 50-ton matte smelter.

In Nuevo Leon the Mexican Coal and Coke Company, of Monterey, is to enlarge its plant at La Esperanza Mine. Chattanooga, Tenn., men are examining the coal lands of Gutierrez Pena, along the proposed railroad from Monterey to Matamoros; the Mexican Mining and Exploration Company is preparing to put in a cable tram between its mines at Asuncion, near Monterey, and the National Railroad.

In Sonora the Vega Mining Company, at Gabilan, has resumed operations. The Cerro Prieto has been purchased for $60,000, gold by C. N. Thomas, who has erected a 20-stamp mill and is planning a new one of 100 stamps, and a cyanide plant to treat the tailings. The machinery of the Yaqui Smelting and Refining Company, of Toledo, O., is being received at the smelter site, called Toledo, on the Yaqui River, and erection is rapidly progressing. The Sonora Development Company, of Kansas City, is building a 10-stamp mill in the Montezuma District. The new Huntington mills of the Reina de Oro Mining Company, at El Tiro, in the Altar District, have just started. Rich strikes are reported in Bacoachi District by American prospectors; in the Tucabe Mine of Magdalena District by L. W. Bonney and associates, and in the vicinity of Zubiate. The Soledad Mine, of El Tiro, Altar District, is reported sold by R. G. Arana to O. B. Steen for $75,000, gold, and negotiations are pending for the sale of El Milagro Mine at Ures, Sonora, to an American company.

In El Oro District of Mexico and Michoacan, among new companies organized in the last two weeks the most important are the Colon & Negromonte Mining Company, capital $500,000 Mexican, to work claims of the same name in Tlalpujahua; the Chihuahua y Anexas, capital $75,000, Mexican, to work 14 pertinencias in El Oro; the Maria Teresa, capital $360,000, Mexican, to work the Maria Teresa claim in El Oro, and the Jupiter Mining Company, capital $300,000, Mexican, to work 40 pertinencias on the northern extension of the Old Abe in Tlalpujahua, these last three named being largely controlled by J. C. Mordaugh and Wm. Hughes, of the City of Mexico, with Guido de Voltaire as manager of the Jupiter. The Nuevo Nacional Mining Company, Tlalpujahua, has resumed operations; the new double compartment shaft of the San Patricio Mining Company is down 75 meters, and the foundations of the new 100-stamp mill of El Oro Mining and Railway Company are finished and the machinery is on the ground.

There are now being derived from streams in the various States the following: Jalisco, 20,000 h. p.; Michoacan, 10,000 h. p.; Hidalgo, 7,000 h. p.; Vera Cruz, 30,000 h. p.; Mexico, 12,000 h. p., and Pueblo, 20,000 h. p., with Sonora and other western States not accounted for.

In the city of Guanajuato the Electric Power Company has its transformer house equipped, and needs only to make connections and run its distributing lines through the camp. Among other large properties, the Sirena, of the Guanajuato Consolidated Mining and Milling Company, will change to electricity at both mines and mill, the motors having already been ordered. It is expected that a combination will be formed to unwater the Valenciana and other of the old bonanzas. South of Guanajuato a few miles the Jose Moreno mines are said to have been sold for $325,000 Mexican.

Exchange on New York has been falling the last fortnight, closing August 4 at 230¼. The Mexican Government has taken 232½ as its basis for duties during August.

In mining stocks the new companies of El Oro and Tlalpujahua are in great demand, Bessie bringing $28, Old Abe $70, Victoria y Anexas $450, Union $105, Progreso $65, Aldebaran $170, Noche Buena $60, Santa Rosa $90, Antares $85, Luz de Borda $125, and Dos Estrellas up to $3,560, an increase of over $1,000 in the last two months. Of the other stocks in demand Monterey Iron and Steel brought $106, Cinco Senores $205, La Paz, Matehuala, $740, Santa Gertrudis $91, Augustias $101, and the Amistad y Concordia $90.

Johannesburg. July 6.

(*From Our Special Correspondent.*)

Results show that the best section of the Witwatersrand is about 12 miles long. Although this section has produced by far the greatest percentage of the gold, it must not be thought that the extreme eastern and western ends have been neglected. In fact, just now there is considerable activity in these divisions, both in development and in prospecting with the diamond drill. Neither on the east nor the west has the end of the Rand deposit been reached. Had not the war intervened, prospecting would probably have traced the reef much further west. Prospecting since has proved thousands more claims to contain gold in payable quantities. The results obtained from the western Rand in the past cannot compare with those from the Central Rand. The Randfontein section, on the extreme west, began crushing early, the company having been formed in 1889, but the results are discouraging. The group is the largest on the Rand. For a long time only one reef was worked, namely, the Randfontein Leader, but in 1898 a new reef, about 140 ft. from the old one, was opened. Much underground prospecting has been done since, and the position of the mines may now be summed up as follows: (1) Old Leader reef; (2) 5½-in. reef, assaying $15; (3) reef assaying $37; (4) 6-ft. reef, assaying $12. Numbers 2, 3 and 4 are the new reefs.

These discoveries in 1899 changed the position of the Randfontein group. Most of the new discoveries were made underground, because of the clay and red sandstone overlying over the rock containing the reef.

In the Central Rand, one of the two workable reefs, the Main Reef, is much wider than the stoping width, so that the waste is small. On the Randfontein Leader, about 12 in. wide, the greater part of the stuff broken is waste and careful sorting is indispensable. In the past this sorting was inadequate; hence the poor results. As in other sections, much costly experimenting has been carried out. On nearly every Randfontein mine are to be seen a whole battery of vanners, now discarded. In fact, one sees more vanners on the Randfontein group than on all the other mines put together. As far as the Rand is concerned, vanners may be considered ancient history.

In the Central district, the veins strike practically east and west and dip south; in the Randfontein the strike is approximately north and south and the dip east.

The Randfontein district is lively just now. Six of the mines are increasing or have increased their stamping capacity to 100 stamps. It is expected that one of the renovated batteries will start crushing August 1, and the work is being rushed on those mines. Where mills are not ready, more ground is being opened. Under Mr. Pope Yateman, the new general manager of the Randfontein, no doubt there will be better times for this section in the future. So satisfactory has the development on the new reefs proved that some consider Randfonteins an excellent safe investment. The system of keeping assay plans, general mine plans, etc., is similar to that on other parts of the Rand. On account of the steep dip, about 60°, the plane of the reef is chosen in making the assay plans. This is pre-eminently a district for sorting, and in the new construction much attention is given this matter.

Promoters are sanguine. Here is this group, not a mine of which has yet proved a distinct success, with its gold-bearing strata dipping 65°. Yet on the deep level claims, 1,400 ft. from the outcrop, syndicates are prospecting with the diamond drill. The reef will be found at more than 3,000 ft. from the surface. This is for the first row of deep levels. What will be the depth of the "deep deeps?" Unlike the Central Rand, the strata do not flatten out. A cautious man prefers to see the Randfontein mines actually paying dividends before putting much of his money into such deep level ventures.

Auckland. July 8.

(*From Our Special Correspondent.*)

Iron Smelting.—Sir A. J. Cadman, formerly Minister of Mines, who has been in Great Britain for some time endeavoring to float a company to work New Zealand iron deposits, has returned. It is understood that he has been successful in forming a provisional company, with a capital of £500,000 ($2,500,000). Whether the company will begin work, however, depends upon the report of an engineer who is to be sent out from London to examine the Parapara limonite deposit in Nelson and the Taranaki ironsands. At the former locality the conditions are believed to be very favorable, there being an immense deposit of ore of good quality, with coal and limestone close at hand, and a harbor not far away. As regards the Taranaki ironsands, they require briquetting before smelting and carry some titanium, but the amount available is very great.

Barewood.—This old property in Otago, which has been worked intermittently for many years, generally with payable results, is again on good stone. The June return was 185 4-5 oz. of retorted gold (value about £700, or $3,500) from 220 tons.

Quartz Mining at Reefton.—The Alpine Company recently has struck a good body of stone in its mine. During May the Progress Mines crushed 4,858 tons in the 65-stamp mill, producing 1,822 oz. of bullion, valued at £7,590; 85 tons of concentrates were chlorinated, yielding bullion to the value of £1,051; 2,025 tons of tailings were cyanided, producing bullion valued at £645; total production for the month £9,286 ($46,430). The Golden Fleece crushed 1,185 tons in the 20-stamp mill, the total return from the plates, and cyanided tailings being £2,247 ($11,235) besides 11 tons of concentrates. The Wealth of Nations crushed 1,006 tons in the 20-stamp mill, obtaining from the plates and the cyanide plant bullion valued at £1,299 ($6,495).

Hauraki Goldfield.—The last monthly return of the Waihi Company was £51,336 ($256,680) from 17,944 tons, equal to £2 17s. 3d. ($15) per ton. This brings the output of the mine for the first half of 1903 to £313,161 ($1,565,805), won from 108,999 tons of ore. At No. 5 shaft a very large Cornish pumping plant is to be installed, to supplement the two pumps already in use. The engine foundations are being excavated. The work will occupy some twelve months. The Talisman Company obtained during June bullion to the value of £7,518 ($37,590) from 3,850 tons, equal to £1 19s. per ton. The company now has all their 50 stamps at work, and expects that the present rate of production will be maintained some time. The gold saving plant has lately been increased by the addition of 12 4-foot Union vanners, a 16-table canvas plant, and a number of vats, in which slimes are to be agitated with cyanide solution by compressed air.

The Crown Mine's latest return is £7,490 ($37,450)

from 3,076 tons, which brings the total production of this mine to date to over £500,000 ($2,500,000).

Other leading returns for the past month are: Waitekauri Company, with £3,842 ($17,410), from 947 tons of stone obtained in the old Waitekauri mine; Komata Reefs, with £3,075 ($15,375) from 1,260 tons, and Tairua Broken Hills, with £2,130 ($11,650) from 600 tons. Tributers at the Thames and more especially at Coromandel have during the month had several good crushings.

Diamond Drill Boring.—The borings at the Woodstock Mine, Karangahake, are apparently not proceeding satisfactorily, and very little is heard concerning them. At the Grand Junction Mine, Waihi, an inclined bore hole from the 500-ft. level has reached a depth of 400 ft., but the work has been impeded to some extent by the necessity of tubing the hole, owing to soft, broken ground. The directors of the Victoria Company, Thames, have accepted the tender of the Goldfields Diamond Drilling Company of Kalgoorlie (Western Australia) for a bore hole to be put down to a depth of 2,000 ft. in the company's foreshore claim. The deep boring scheme at the Thames is at last making some headway. A considerable sum has been subscribed by local public bodies and private persons. This, together with the Government subsidy, has enabled the committee to give an order for the first bore hole to the Goldfields Diamond Drilling Company.

GENERAL MINING NEWS.

ALASKA.

Rich placer finds are reported near the headwaters of the Stikine.

ARIZONA.

COCHISE COUNTY.

Copper Queen.—The moving of this smelter from Bisbie to Douglas has begun. The slag dump will be sent to Douglas for treatment.

MARICOPA COUNTY.

Haxworth Copper Company.—This property of 25 claims has been sold for $100,000 to Chicago and Milwaukee men.

MOHAVE COUNTY.

(*From Our Special Correspondent.*)

Cyclopic.—The new owners of this property at Gold Basin are putting in new machinery and trying new processes for the handling of the low-grade gold ores.

Gold Road.—This property, at Acme, is working close to 300 men in the mine and the 300-ton mill and cyaniding plant.

Leland.—The new reduction works for this mine on the Colorado River are nearing completion. The railroad being built by the company from the mine to the mill, and thence to the Santa Fe Pacific near Needles, Cal., employs 500 men, and trains will be running by Sept. 15.

Loma.—A rich strike of gold and silver ore is reported on this claim.

Marquette Exploration Company.—This company, which bought the new gold discovery from Dempsey & O'Dea, at Pilgrim, is working three eight-hour shifts sinking three 100-ft. shafts.

PIMA COUNTY.

(*From Our Special Correspondent.*)

Imperial Copper Company.—This organization has been formed under the auspices of the American Mining and Reduction Company to acquire the properties in the Silver Bell District, generally known as the Old Boat Mine, notice of which was given in the JOURNAL of May 16. The new company is incorporated under the laws of the Territory of Arizona. The properties consist of upwards of 50 claims, being a consolidation of mines heretofore known as the Mammoth Copper Company, and the Silver Bell Mining Company. Some of these claims were located many years ago and have been large producers of copper, but the deepest shaft does not exceed 400 ft. Work has begun with the intent of connecting the camp by rail with the Southern Pacific Railway at Red Rock, of erecting a smelter of enlarged capacity, and of a general exploration of the ore deposits. Reports at Tucson represent that some large and before unknown bodies of copper ore of high grade have recently been opened. The ore consists largely of bornite and chalcopyrite, besides the oxides and carbonates. The property has been examined by W. F. Staunton and others. The reopening and working of the mines of the district will contribute largely to the growth and improvement of Tucson, which is only 45 miles southeast.

SANTA CRUZ COUNTY.

(*From Our Special Correspondent.*)

Eureka-Mable Group.—From these mines at the Salero a shipment of over 500 sacks of high-grade smelting ore has recently been made to El Paso. The ore carries silver, copper, gold and lead with some manganese spar and quartz, an excellent smelting mixture, but owing to the abundance of the gangue it requires machine concentration, a want which will probably soon be supplied. There is here a good opportunity for any well-proved practical pneumatic concentrator, as water is not abundant.

McDonald Bros.—This group of gold-bearing claims is reported sold to eastern parties, who will develop it.

Tres Amigos.—This gold mine at Oro Blanco has been sold to Col. William Andrews of New Mexico and other parties from Pittsburg, Pa., and is to be actively worked in connection with the mines of the Sorrel Top group, also acquired.

YAVAPAI COUNTY.

Iron King.—Fully $20,000 worth of machinery is reported purchased by the American Copper Company for this mine in the Agua Fria country, principally air compressors and machine drills.

United Verde.—The assessed value of this mine has been reduced by the assessors of the county from $3,000,000 to $1,000,000.

(*From Our Special Correspondent.*)

B. B.—This property, on Chenny Creek, has a new gasoline engine hoist. Fourteen men are working 3 shifts.

Iron King.—The 100-ton mill at this mine, southeast of Prescott, is in operation.

Rosaline Group.—A half interest in this group of 8 copper and gold claims, on Copper creek, has been sold to D. N. Bartholdi, of Jerome.

CALIFORNIA.

BUTTE COUNTY.

Gold Bank.—This old mine, long owned by the Stow heirs, is now the property of Harry P. Stow, for many years part owner and superintendent. The mine has been closed a few months, but Mr. Stow is about to start work again. The tunnel is 2,300 ft. long and ends 700 ft. below the collar of the shaft.

Quartz.—In this mine, near Inskip, A. D. Larzelere, superintendent, which was recently bought by Reno, Nev., men, 16 miners are employed and a 10 stamp mill is to be put up. The top ground is first to be sluiced off.

Spring Valley.—This famous old drift mine, recently sold to T. L. Vintin, of Cherokee, will again be worked. Mr. Vintin intends running a tunnel on flume grade 400 ft. to a place where the ground is known to be rich.

CALAVERAS COUNTY.

Angels Mine.—This mine at Angels, owned by James V. Coleman, of San Francisco, is to have another 20-stamp mill.

Douglas Flat District.—The gravel mines at this place under supervision of Job Evans, are employing a number of men. The large shaft is down over 180 ft. The sale of the mines, etc., of E. Cunliffe and W. L. Driver to G. D. Avery, between Murphys and Sheep Ranch, and the sale of Jos. Heinsdorff's group nearby, will give an impetus to mining in that region.

El Rio.—This mine at Banner has temporarily closed from lack of water. Work will be resumed later.

Lava Bed.—This gravel mine at Railroad Flat, owned by O. Lampson and bonded by a St. Louis company, has started up under the superintendence of Don M. Palmer.

South Bank.—W. H. Clary, his son Henry and C. C. Adams are to get up a company to work this mine near Murphys. Little work has been done on the claim, though it is an old one.

Vallecito District.—The Manitou placer near Vallecito has been bonded by Dr. Nelson, who has plenty of means to develop the buried channel. Work will start before long. Mr. W. Moyle is about to open the pocket mine on Red Hill, near town. The mine has been worked off and on for over 40 years. Several companies are working on Balaklava Hill, a mile from Vallecito, drifting out the gravel.

EL DORADO COUNTY.

Rescue Mining Company.—This company has recently acquired the Coon Crossing quartz mine near Rescue, and will begin development. The ledge is small, but carries high grade ore. A. F. Anable will be superintendent. The directors are R. M. Crackles, P. A. Mariotte, W. E. Reed, A. F. Anable and J. P. Vane. A 5-stamp mill is to be erected.

FRESNO COUNTY.

White King.—This claim, first known as the Valley View, later as the Resurrection and now as White King, is near Trimmer. O. V. Blom has begun suit for a half interest in the property.

KERN COUNTY.

Butte Company.—This company, at Randsburg, has put up a new gallows frame, new engine house and a Fairbanks & Morse gasoline hoist.

Carbonate Queen.—This mine on Indian Creek, near Amalie, owned by C. E. Ramy, will probably be bonded by Bakersfield men, who are now examining it.

Minnehaha.—Eight men are running a tunnel on this mine at Randsburg.

Pacific Smelting Company.—This company, A. W. McRae, manager, expects soon to have two 50-ton furnaces working on the site of the McKittrick branch line.

MARIPOSA COUNTY.

Exchequer Mining Company.—A prospect tunnel is being driven on the East vein of this mine, near Hornitos, Miles O'Brien, superintendent. A new shaft is also being sunk. The Twilight and Hyderabad, included in the Exchequer group, are also worked.

NEVADA COUNTY.

Bellefontaine.—This property near Nevada City, which has been idle some time, may shortly be reopened.

Brunswick.—A 11,000-lb. electric sinking pump has arrived from Allentown, Pa., for this mine at Grass Valley. The pump is the smallest of three ordered and has been lowered to the 900 ft. level.

Central Consolidated.—This mine, on Little Greenhorn, Oscar Coflin, superintendent, has been incorporated and will be extensively developed.

Champion Mining Company.—This company, at Nevada City, E. R. Abadie, superintendent, made its recent rich strike at a place which leads off from the 1,600-ft. level into new ground.

Huron Mining Company.—For this mine at Omega, W. H. Bray, superintendent, a 5-stamp mill is to be built.

Lecompton.—New machinery is being installed at this mine, near Nevada City, and the pumps have started. Mining will begin as soon as the water is out.

Merrifield.—The shaft being sunk by the Champion Mining Company is down 1,740 ft. and going down further.

Murchie Consolidated Mining Company.—At this property, at Nevada City, now being reopened under supervision of J. C. Campbell, hoisting from the 300-ft. level has commenced. A carload of sulphurets shipped to the Selby Smelter recently went $165 per ton. J. B. Goodwin, of San Francisco, is president and C. F. Humphrey secretary.

Orleans.—The lease of G. W. Baldwin being up, this mine at Gold Flat will revert to the Gold Tunnel Mining Company and a plunger pump is to be put in.

Posey.—A large rock crusher has been bought for this mine from the Delhi claim.

Sierra Nevada Mining and Development Company.—The American Hill Mine, of this company, Robert Simmons, manager, is having a shaft sunk, and hoisting works erected.

PLACER COUNTY.

Cedar Creek.—The California Mining Company, T. H. Wilkins, president, which recently bought this mine at Shady Run, has 20 men employed.

Red Point.—In this drift mine at Damascus, J. A. Ferguson, superintendent, miners are searching for the lost lead or channel and fewer men are employed than usual.

RIVERSIDE COUNTY.

Clay, lime, gypsum and glass sand are found near Corona. Leo Krooner and others are about to start a factory for firebrick, tile, etc., at this place.

SACRAMENTO COUNTY.

Old Homestead Mining Company.—This company is mining in the Red Bank Vineyard District, on new ground, and is putting in machinery.

Prosperity Gravel.—This mine, near Folsom, will probably be reopened by P. C. Cohn. It started up last year, but was closed after a time.

SAN BENITO COUNTY.

Stayton.—The shaft in this quicksilver mine will soon reach 150 ft., when crosscutting will start.

SAN DIEGO COUNTY.

Lepidolite Mines.—The company owning the lepidolite mine near Mesa Grande, A. L. Ross, manager, is driving a tunnel to cut the ledge 150 ft. below surface. Many crystals of tourmaline are sent to San Diego to be ground. The company is producing 300 to 350 carats monthly of gem material.

SAN LUIS OBISPO COUNTY.

Jack Ranch.—On this mine, on the R. E. Jack ranch, about five miles from San Luis Obispo, J. M. Johnson, superintendent, a 2-stamp mill is being set up. Eastern men are opening the mine.

SANTA CLARA COUNTY.

Guadalupe.—This quicksilver mine, owned by the Century Mining Company, near New Almaden, is being reopened and a large force of men is busy. The mine has been idle and full of water for over 20 years. Increased prices for quicksilver and improvements in extraction make it possible for the mine to work at a profit.

SHASTA COUNTY.

Crown Deep.—This mine, in Lower Springs District, owned by W. P. Miller, of Golden Gate, is to be reopened by New York men under the superintendence of James Hume. The ore will be shipped to the Mountain Copper Company's smelters at Keswick.

Northern California Gold Mining Company.—This company has been organized to open a group of seven quartz mines on Cow Creek, formerly owned by H. Reinfelt. The officers of the new company are M. F. Edwards, president; W. S. Nickol, vice-president; C. Elison, secretary; C. E. Edwards, treasurer, and E. F. Adams, general manager. Men are busy.

SIERRA COUNTY.

Ruby.—This property at Forest City, worked for 15 years past as a drift mine, is now worked as a quartz mine, a ledge having been found at a point where the gravel ceased to pay.

SISKIYOU COUNTY.

A 14-mile ditch is contemplated, to run from Scott River to Hamburg Bar, Klamath River. Denver men who have the project in hand have bonded a number of claims.

American.—This mine, owned by the D. N. Lash estate, on the North Fork of Humbug, has been sold to Oakland people.

Headwaters.—A tunnel is being run on this mine on Humbug and the ledge is expected to be found in 200 ft. There is already a mill on the ground.

STANISLAUS COUNTY.

Martel Mining Company.—C. H. Spinks, superintendent of this mine at Red Mountain, is trying to induce the Stanislaus supervisors to build a road from Westley to the mines, so that the magnesite may be hauled to the railroad station. A good wagon road would lead to the opening of this and other properties at Red Mountain.

TRINITY COUNTY.

Globe.—At this mine, at Dedrick, the air-compressing plant has been put in operation. Twenty men, under Superintendent R. S. A. Skinner, are doing the development work on the property.

Miner's Dream.—The mill for this group, owned by the Chonchilula Gold Reef Mines Company, J. S. Olds, superintendent, has been shipped from Denver.

YUBA COUNTY.

Michigan men have bought 1,700 acres of land suitable for gold dredging, consisting of the Beeney farm and O'Brien land, near Marysville. Robert E. Cranston took the option for the Eastern men. O'Brien still has the right to farm portions of the tract.

Pennsylvania Mining Company.—The 20-stamp mill, hoist and electric motors of this mine at Browns Valley have been sold to San Francisco men, who will remove them. The Pennsylvania has closed for good.

Sweet Vengeance.—This mine, two miles from Brown's Valley, idle thirty years, is about to be reopened. Several hundred tons of quartz have recently been milled as a test, with satisfactory results.

COLORADO.

BOULDER COUNTY.

Lottie.—H. J. Newman and C. P. Campbell have bought this claim on Lee Hill, where the recent free gold strike was made.

FREMONT COUNTY.

United States Reduction and Refining Company.—This company's zinc plant at Canon City is completed.

GUNNISON COUNTY.

Headlight.—In this mine, at Spencer, a copper vein of good quality is reported opened.

HINSDALE COUNTY.

Blue Bell.—Two and a half feet of ore, showing galena, brittle silver and gold, is reported from this claim in Burrows Park.

GILPIN COUNTY.

(*From Our Special Correspondent.*)

Gilpin Ore Shipments.—The shipments of smelting and crude ores, tailings and concentrates from the Black Hawk depot of the Colorado & Southern road to Denver smelters and Idaho Springs mills in July were 276 cars, or 5,520 tons; 41 cars, or 820 tons, more than in June, a gain of nearly 20 per cent Much of the gain was due to the resumption of shipments to the Golden Smelter from the Saratoga property, and if the Golden plant can find an outlet for its matte (it has not been able to since the Globe smelter closed at Denver, on account of labor troubles), the plant will soon be in shape to handle custom ores again.

Beacon of the West.—Idaho Springs men who recently took a lease and bond on this property in Russell District have purchased the machinery on the Crockett Mine, near Idaho Springs, consisting of a Hendrie & Bolthoff hoist and two 60 h. p. boilers. The shaft is down 250 ft. and will be sunk deeper. M. W. Tanner, Idaho Springs, is manager.

Chester.—Denver owners of this property, near the head of Elkhorn Gulch, have been making arrangements for resuming operations. Byron Lake, Central City, is manager.

Clear Creek Mining and Reduction Company.—Sinking has begun at the Saratoga Mine, to make the shaft 1,100 ft. deep. Shipments to the Golden Smelter are increasing, and the working force of 40 men will soon be doubled. The present shipments average 40 to 50 tons daily, the low grade ores going to the Rocky Mountain concentrator at Black Hawk, the smelting product to the Golden Smelter. R. E. Nelson, Russell Gulch, is superintendent.

Dirigo.—Lincoln A. Godshaw, of Denver, acting on behalf of New York men, has purchased this group of six claims at Wide Awake, in the Hawkeye District, the consideration being $22,500. The interests of the Brinckerhoff estate, amounting to $5,563, was paid down, leaving a balance of $16,938 to be paid on or before December 1. The property has been developed by two tunnels of 500 and 550 ft. respectively and a contract has been given to extend the lower tunnel in 600 ft. The product has been all milling ore, running between 3 and 6 oz. gold to the cord. Peter Stewart Perigo is in charge.

Gold Trust Mining and Reduction Company.—This company, operating at Frisco, in Summit County, has shipped a carload of ore to the Hidden Treasure Mill at Black Mountain for treatment.

Hampton Consolidated Mining Company.—Denver men interested in the Hampton are figuring on putting in machinery. The Hampton has produced some very fair gray copper ores. N. C. Hughes, Central City, is manager.

Mountain Chief.—A. W. Hurd, of Denver, has taken hold of this long-idle property, under a three years' lease and bond and gave a contract to take out the water and sink 100 ft. The Mountain Chief is supposed to be the western extension of the famous Perigo vein. E. Stephenson, Rollinsville, is in charge.

Old Town Consolidated.—Sinking has been resumed at 1,025 ft., with the intention of going down 500 ft. A new Snow pump at the 10th level will throw the water to the big compound pump at the 6th and a Cameron is being used for sinking. Last month the shipments were 1,400 tons, 1,000 tons going to the Rocky Mountain concentrator at Black Hawk, the balance going to Idaho Springs mills and smelters. Between 50 and 60 men are at work, some of the leasers averaging big wages. The property is operated by Pittsburg and Idaho Springs men, with G. K. Kimball, Jr., as manager.

Onoko Gold Mines Company.—A new shaft building, 30 by 60 ft., is to be erected on the Phillips claim and a plant good for 700 or 800 ft. depth will be installed. The shaft is down 225 ft., and has been retimbered. W. L. Shull, of Russell Gulch, is manager. The main offices are in the Bank block, Denver.

Powers Mining and Milling Company.—Pennsylvanians are interested in this property, which has produced a very fair grade of enargite ores. Operations are temporarily suspended on account of water. The company is installing a 45 h. p. boiler and sinking pump. J. Murphy, Central City, is in charge.

Spar Group.—Judge Farland, of Pittsburg, Pa., has taken an option on this group of three claims in the Phoenix District and will try to organize a company to operate the property. In the meantime developments will be carried on. The property is owned by F. R. Shaff, of Rollinsville.

Sydenham Leasing and Mining Company.—The company is working the Mine property and has arranged for a new boiler of 40 h. p. capacity. S. W. Brereton, Central City, is manager.

LAKE COUNTY—LEADVILLE.

(*From Our Special Correspondent.*)

Bon Air and Starr.—First class iron ore is shipped, also some very high grade material. Prospecting is being carried on in the virgin territory of the Starr.

Campbird.—This mine, at Alicante, owned by Jacob Buffehr & Sons, broke into a rich body of ore at the breast of the tunnel during the week. The ore runs 5.7 oz. gold and 67 oz. silver. The tunnel is in 200 ft. and shows a large body of low grade milling ore. Not enough work has been done to demonstrate the extent of the ore shoot.

Crown Point.—This property, under lease to Maurice Starne and J. D. Murphy, is shipping about 50 tons of iron daily.

Diamond.—This property, at Upper Big Evans Gulch, is becoming one of the camp's largest producers. The diamond drill has shown a large body of sulphides in the lower contact. At present the mine is shipping 100 tons daily of oxidized ore. The Vega property, owned by the same company, will start up shortly.

Fanchon.—This mine, at Sugar Loaf, is shipping ore of excellent grade. Development work is pushed.

Ibex Mining Company.—The company is shipping 8,000 tons per month of siliceous and sulphide ores.

Mikado.—This mine is shipping 25 tons daily of siliceous ore from the upper levels. The work of retimbering the shaft is completed and whenever the other shafts nearby start pumping the lower levels will be worked.

Moyer.—This mine of the Iron-Silver Mining Company still keeps up its heavy production of 300 tons daily. The zinc-sulphides are being shipped to Kansas and Canon City.

Wabash Group.—This group, in Echo Canyon, near Twin Lakes, has opened a vein of free milling ore from 17 to 40 ft. wide that runs well per ton. J. D. Bartlett & Son, working under a bond and lease, found the vein and opened it for 40 ft. They will start a tunnel 200 ft. further down the hill. It is the biggest strike made in that section for a number of years.

SAN JUAN COUNTY.

(*From Our Special Correspondent.*)

Tests are being made at several mills in this county of the Pierce gold separator and amalgamator.

Ada Mining Company.—This Silverton company is a recent reorganization of the Joseph Gibbons Mining Company, and is operating the Pride of the West mines in Cunningham Gulch, under the management of C. W. Dennison. A crosscut is being run.

Aztec Mining Company.—This concern is acquiring large tracts of ground near Chattanooga. P. M. Salmon, of Aztec, N. M., is in charge.

Continental Mining Company.—This company has increased its force to 25 men and is erecting several new buildings. Ore shipments continue regular.

Blue Belle.—At this property in Burroughs Park a strike of silver ore with good gold values and some copper and lead is reported. The property is owned by J. W. Vickers et al.

Bobtail.—The recent strike has proved so important that the working force has been increased to 100 men.

Brooklyn.—New Yorkers are negotiating for this group of eight claims between Prospect and Henrietta basins. The men own the Hoosier group, which is to be tapped by a long tunnel.

Crystal Group.—Tony Bayle and L. W. Russell, of Durango, have purchased a half interest in this group from S. G. Lohr et al., and will soon put on a large force of men.

Evening Star.—Dan Donovan, of Silverton, has 10 men at work on this group, in Mastodon Gulch, owned by the Sunlight Mining Company. A winze is being sunk on a vein of pay ore.

Green Mountain Tunnel.—The recent strike is one of the most important of the season. The vein is 10 ft. between walls and averages $20 gold by mill test.

Guggenheim Exploration Company.—Fifteen men are cleaning out the old Titusville workings, near Silverton. The mine will soon be in shape to resume on a large scale.

Hidden Treasure Group.—It is stated that negotiations for the sale of this property to the Gold King Mine Company have been concluded and the property transferred. The Sunnyside Extension is included in the deal.

Iowa Gold Mining Company.—This company has let a contract to Weir, Kunkel, et al., to drive a tunnel 300 ft. on the Tiger vein, near Silverton, with the privilege of continuing to 600 ft.

Queen City Tunnel.—This tunnel, near Silverton, has been completed to the shaft for ventilation. Development is pushed systematically.

Ruby Basin Mining and Tunnel Company.—Shipments have begun from the recent strike and will continue during the season.

Silent Friend Group.—This and the Mattie B. group, altogether 15 claims in Mastodon Gulch, have been purchased by Herbert S. Shaw, of Denver, from Sherer Bros. Contracts have been let for continuing the tunnel toward the Esmeralda vein.

Snowflake.—The shaft having been unwatered, three shifts are sinking to a depth of 200 ft.

TELLER COUNTY—CRIPPLE CREEK.

(*From Our Special Correspondent.*)

Ajax Gold Mining Company.—Leases are to be let on some of the surface ground on Battle Mountain. The company owns a considerable area and has done a large amount of work on it. The working shaft is over 1,000 ft. deep, and a large number of drifts have been run. The company is shipping a fair amount of ore.

El Paso Gold Mining Company.—The directors have declared a dividend of ½ cent per share, to be paid August 25. The July output was about $50,000, and it is expected that the monthly output will be increased to $75,000 on completion of the drainage tunnel, which will benefit the El Paso first. The mine is on Beacon Hill, and the largest in its vicinity. William Bainbridge is in charge.

Gold Coin.—The latest reports indicate a great improvement, especially in the lower levels, where from all accounts the Dorothy vein is now making an excellent showing. For some time past this mine, while doing very well, has not shipped the ore that it did some time ago.

Golden Cycle.—This property continues to make a very good showing, especially on the lower levels. When first purchased by its present owners the mine was known as a low-grade one, but now the average value of the ore is understood to be about $27 per ton.

Jo Dandy.—It is reported on authority that R. P. Russel, of Cripple Creek, has obtained a bond and lease, but at what price cannot be learned. The property has been owned for some years by Messrs. Rice and Coe, the latter, who died recently, having charge. The mine is situated on Raven Hill, and has produced considerable ore.

Little Bessie.—Work has been resumed on this property on Beacon Hill. The operators intend to sink deeper. Considerable work has been done, but so far no ore has been shipped. The property is situated in a very good neighborhood and developments are watched with interest.

Moon-Anchor.—There is considerable interest in the opening of ore on the sixth level. The ore is thought to be the continuation of the shoot that produced so much ore a few years ago. This shoot was never found below the fifth level, though a large amount of work was done both by the company and by an English company that had an option on the property. The property is at present worked by lessees.

Pharmacist Mining Company.—Notices of the annual meeting on September 7 have been sent out. The manager's report shows that the property is worked entirely by lessees, and while not very much is done at present a fair amount of ore has been shipped. The main shaft is 660 ft. deep. The statement of production shows 1,878 tons of ore were shipped having a gross value of $51,870 and a net value of $32,124, from which the company received a royalty of $7,726. The gross value of the ore per ton was $27.61; treatment charges, $10.50; net value, $17.11; royalties, $4.11, and the part received by the lessees, $13. The company has at present in its treasury $5,591. Albert Wagner, of Cripple Creek, is manager. The company's title to the property has been cleared, and there is no litigation pending.

Portland Gold Mining Company.—This company has announced its intention of leasing the Morse group of 35 acres at the north end of the property as soon as suitable lessees can be found. On this group No. 3 shaft is situated, but the shaft will not be leased and the leasing will not interfere with its working, as the leases will be given to the depth of but 250 ft. It is understood that all three shafts will be deepened at once. No. 1 shaft is at present something over 1,100 ft. deep. The new 100-drill compressor is in place at No. 2 shaft.

Spring Creek Cyanide Mill.—A cyanide mill to treat the low-grade oxidized ores of Copper Mountain is being erected on Spring Creek, near the end line of the Fluorine claim. Mr. King, of the King-Craig Metals Company, has charge of construction.

Stratton's Independence, Limited.—It is again reported that this company is to push its suit against the Stratton estate in the United States Court. The suit is for $8,000,000, the plaintiffs alleging that the mine was salted by persons in the employ of Mr. Stratton, while it was being examined for purchase. The mine is working steadily and producing a large amount of medium low-grade ore.

Vindicator Consolidated Gold Mining Company.—The semi-annual report shows this company to be in very good shape. The amount of ore shipped during the year was 8,048 tons, of the assay value of $307,913, which, after deducting the freight and treatment charges, gave net values of $236,081. The total receipts were $239,671. After paying all mining expenses and the amount due to the lessees and general and extra expense the net profit was $75,380. The cash on hand January 1 was $126,519, and the dividends paid during the year so far are $110,000, leaving in the treasury on July 1 $91,899. During March, April and May the profits were not great, on account of low-grade ore, but during June the profits amounted to $35,000. F. J. Campbell, of Denver, is general manager.

IDAHO.

CUSTER COUNTY.

White Knob Copper Company.—The 900-ton smelter of this company, at Mackay, is about completed. A 10-drill air compressor succeeds the 3-drill machine.

IDAHO COUNTY.

Sunnyside.—The machinery for this mill is awaiting the completion of the wagon road.

LEMHI COUNTY.

(*From An Occasional Correspondent.*)

Blackbird District.—In this district interest has been revived in valuable deposits of copper, gold, lead, etc. With the probability of a railroad being run into Salmon City and the advent of the surveyors in the field, many promising properties have recently been bonded to eastern men.

Gilmore Mining Company.—This company employs 30 men and is shipping two carloads of ore weekly to Salt Lake.

Gold Dust.—This mine, near Leesburg, has a crosscut tunnel 425 ft. long, a shaft 150 ft. deep, and 300 ft. of drifts. The vein is 83 ft. wide. A 10-stamp mill and cyanide plant are being erected.

Haidee.—The crosscut tunnel is being driven 4 ft. daily, and is in 125 ft. In a distance of 900 ft. it will cut the vein 250 ft. below the present workings.

Italian.—This property has been purchased by the Bitter Root Mining and Milling Company.

Kandaho Gold Mining Company.—This company, on Wimpey Creek, has encountered a 2-ft. ore shoot, said to assay up to $500 per ton in gold.

Kittie Burton.—Fifteen additional stamps have been ordered. The new cyanide plant is nearly completed.

Le Sieur Mining Company.—This company owns 260 acres of ground, embracing the Prairie Basin opal mines. Twelve men are employed.

Pollard.—Recently 6 ft. of good lignite were cut in this coal mine at Salmon City.

Ramey.—This gold quartz property was recently sold to New York men, who intend to begin active development.

South American Group.—The Idaho Chemical Gold Mining Company is preparing to start development of this group near Yellow Jacket.

SHOSHONE COUNTY.

The Washington Water Power Company is ready to supply electric power for the Coeur d'Alene mines. All the new machinery, water wheels, dynamos, oil switches, switchboard and all apparatus for generating the power have been tested. The substation apparatus has been shipped to Wardner, so that by August 20 electric power may be supplied to the Bunker Hill & Sullivan property.

Happy Day.—Work has been resumed on this claim near Wallace.

INDIANA.

(*From Our Special Correspondent.*)

United Traction Coal Company.—This company has been incorporated with a capital of $100,000. George F. McCulloch, Hugh J. McGowan, Arthur J. Brady and other street railway men are the incorporators. The purpose is to hold coal lands, leases and properties that have been acquired in the Indiana coal fields and get a coal supply. It is understood that the Indiana Union Traction Company plans to build a line into the coal fields of Clay and Sullivan counties.

KENTUCKY.

UNION COUNTY.

National Coal and Oil Company.—This company, with main office in Indianapolis, has purchased coal mines in Western Kentucky with an output of 150 tons a day. The new owners will install modern machinery and greatly improve the property.

MICHIGAN.

HOUGHTON COUNTY.

(*From Our Special Correspondent.*)

Atlantic.—This mine produced 311 tons of mineral during July.

Baltic.—A report covering operations for the year ending December 31, 1902, has been filed with the County Clerk. At the end of 1902 there were 17 stockholders. The Copper Range Consolidated Company owned 99,259 shares.

Calumet & Hecla.—This company has filed its statement for the year ending December 31, 1902. There were 3,896 shareholders. The July production is estimated at 3,400 tons of refined copper.

Champion.—Ground has been broken for an extension of the stamp mill to contain two heads, which should be ready within a year. The July production was 734 tons of mineral.

Franklin.—The July production was 376½ tons of mineral. The fourth head at the mill should be ready in September or October.

Winona.—The July output was 51 tons of mineral.

Wolverine.—The production in July was 518½ tons of mineral.

KEWEENAW COUNTY.

(*From Our Special Correspondent.*)

Ahmeek.—On the Kearsarge amygdaloid a permanent working shaft will be started shortly, near the exploratory shaft. Forty men are employed.

Allouez.—The new shaft has cut the ledge at 50 ft. The inflow of surface water is heavy, but sinking will continue.

Central.—A diamond drill is running near the old mine workings. The Kearsarge amygdaloid lode is supposed to cross the property.

Mohawk.—The mine produced 394 1-5 tons of mineral in July.

ONTONAGON COUNTY.

(*From Our Special Correspondent.*)

Halliwell.—A special meeting of the stockholders was held August 4, in Cleveland, O., to consider the advisability of resuming work. It is possible that the mine, in the Porcupine Mountains, will be worked again.

Hamilton.—A new 100 h. p. boiler has been installed by the Copper Crown Mining Company, of St. Louis, Mo. A tunnel is being driven from the base of a high bluff and a vertical shaft sunk.

Michigan.—According to a report filed with the County Clerk there were 975 stockholders at the end of 1902.

MISSOURI.

FRANCOIS COUNTY.

(*From Our Special Correspondent.*)

The new Missouri Southern Railroad will be opened for traffic on August 17, from Salem, Ill., where it taps the Baltimore & Ohio system, to Bismarck, Mo., where it connects with the main line and Belmont branch of the Iron Mountain Railroad. In this distance of about 200 miles it taps or crosses 10 railroads, making excellent connections for Eastern or Southern business. It passes through the heart of the Flat River lead district, which will now enjoy competition, and will be able to bring in the high-grade Southern Illinois coals at much lower figures than have prevailed hitherto. The road from the Mississippi River to Bismarck has been very substantially constructed, with low grades and light curves, so that it is prepared to do a heavy business at low cost.

MONTANA.

Daly Mining Company and *Daly Realty Company.*—Margaret P. Daly, for herself as trustee for her children, has deeded to these companies 18 mining claims and other property in Silver Bow, Meagher and Lewis & Clarke counties.

BEAVERHEAD COUNTY.

Ajax.—The new strike is said to show $17.80 in gold, $23.65 in silver and 8 per cent lead. A new mill, power plant and tramway are in view.

DEER LODGE COUNTY.

Big Indian.—A strike of rich gold ore is reported in this mine, south of Helena, averaging $30 per ton.

JEFFERSON COUNTY.

Boulder-Comstock.—This mine, near Basin, has been bonded to A. S. Ray and associates, of Butte. A hoisting plant will be put in and the shaft sunk 200 ft. Water has not been reached.

East Helena & Livingston Smelting Company.—A strike is on at the Corbin Concentrator, employing 30 men. The company refused to grant $3 for eight hours' work.

Eva May.—Work has been resumed on this mine near Basin. The ore is said to show $4 in gold, 19 oz. silver and 30 per cent copper.

Jacquemin-Rohtfuss.—The Pittsburg-Montana Mining Company has purchased these three claims for $25,000.

Rose Gold Company.—A rich pocket of free gold was struck in this mine, near Jefferson City, 20 ft. below the surface.

FLATHEAD COUNTY.

Banner & Bangle Mining Company.—A suit by stockholders has stopped the sale of this property, near Troy, for $30,000. It is alleged the property is worth more.

PARK COUNTY.

Kimberly-Montana.—The new 40-stamp mill of these mines at Jardine is expected to be running August 15. The tailings are cyanided.

SILVER BOW COUNTY.

Basin & Bay State Mining Company.—This company has been reorganized under the name of the Jefferson County Mining Company. The following officers were elected: President, Dr. E. G. Hoitt, of Marlboro; vice-president, H. B. Handy; treasurer, C. H. Churchill. The directors are Dr. E. G. Hoit, H. B. Handy, E. T. Houghton, J. H. Fraser and John M. Carpenter, of Marlboro. The company has done nothing for several years, and the mines are full of water.

SWEET GRASS COUNTY.

Cowles Mining Company.—The First National Bank of Miles City has sued for one-half interest in the properties of this company. The interest in contention is valued at $87,500. The company is working three mines in the Boulder District.

NEVADA.

LINCOLN COUNTY.

Tannenbaum.—It is reported that work on these turquoise mines, 60 miles west of Manvel, is to be resumed by wholesale jewelers of New York.

NEW JERSEY.

SUSSEX COUNTY.

Vernon Lime Company.—This company has sold its limestone quarry in the Wallkill Valley, about a mile above McAfee Station, to the Bethlehem Steel Company.

NEW MEXICO.

SIERRA COUNTY.

Richmond.—A rich strike is reported in the 200-ft. level, supposed to be the shoot struck in the 100-ft. level.

GRANT COUNTY.

Aztec.—A 60-ton concentrator is to be erected by the owners of this group for the lessee. The ores are low grade gold and silver sulphides.

Santa Rita.—The concentrator has stopped treating the ore from these mines, owing, it is said, to the price of copper. Development work will continue.

Virginia.—Dr. B. F. Copp has sold his half interest in this mine in the Burros Mountains to Judge Lucius P. Deming, of the Alessandro Mining and Milling Company. Judge Deming is now the sole owner.

OREGON.

BAKER COUNTY.

Alamo.—The sawmill on this property is ready and a 10-stamp mill is on the way.

Eureka & Excelsior.—The Bourne Gold Mining Company has bought this property for $25,000. The sale was under a foreclosed mortgage.

Last Chance.—The Baby McKee Company, operating this mine in the Cable Cove District, has an 8 by 12 hoist on the way.

PENNSYLVANIA.

BITUMINOUS COAL.

Butler Coal, Coke and Manufacturing Company.—This concern has taken charge of Turner & Son's mines, at Ferris, capacity 200 tons daily, and also acquired 500 acres nearby. Frederick Row is president and James Reed general manager, both of Myersdale.

SOUTH DAKOTA.

CUSTER COUNTY.

(*From Our Special Correspondent.*)

Copper Butte Mining Company.—The equipment for the diamond drill has been removed from near Custer to the Copper Butte property.

Inter-State Gold Mining Company.—Men are at work on the Blue Bird group. The deepest shaft is down 60 ft.

Ivanhoe Gold Mining and Milling Company.—This company is a consolidation of the Ivanhoe and Chilcoot groups. Charles P. Boney, of Indianapolis, is one of the largest stockholders. A steam hoisting plant, with air compressor and drills, is to be installed.

LAWRENCE COUNTY.

(*From Our Special Correspondent.*)

J. V. N. Dorr, John Lundberg and A. D. Wilson have begun erecting a 70-ton mill at the Big Bonanza and Buxton mines, near Terry. Chile mills are to be installed for crushing. Electric power will be supplied from the Belt light and power plant, of Lead.

Clover Leaf Gold Mining Company.—The mill is running 20 stamps.

Gilt-Edge-Maid Gold Mining Company.—The company is capitalized with 1,000,000 shares of $1 par value. It is said the new cyanide plant of 125 tons daily capacity will be built this year.

Golden Reward Mining Company.—A new cyanide plant is contemplated near the Union shaft, two miles from Terry. The company hopes to have the smelter at Deadwood running this fall. Ore is being shipped from the Tornado, Little Bonanza, Stewart and Fanny mines to smelters at Denver, Colo., and East Helena, Mont.

Horseshoe Mining Company.—Sixty stamps of the new cyanide plant are in commission. Ore is furnished from the old dumps at the Mark Twain and Golden Sands mines.

Lexington Hill Gold Mining Company.—This company is now reorganized and is operating its 20-stamp wet crushing cyanide plant. Preliminary survey has been run for a new mill.

Lucky Strike Gold Mining Company.—At a special meeting of stockholders the constitution and bylaws were changed, authorizing an increase in the number of directors and an officer outside of South Dakota. C. A. Allen, of Deadwood, is superintendent.

Pluma Gold Mining Company.—At the 300-ft. level 100 ft. of ore is reported. The drift is 600 ft. long, heading for the Monitor vein. Pending the settlement of a lawsuit, work has stopped on the addition to the 40-stamp mill at Pluma.

Two Johns Mining Company.—The workings are being unwatered. C. A. Hallam, of Chicago, one of the principal owners, has been in the Black Hills.

United Ruby Gold Mining Company.—This company has recently organized. The officers are: Geo. V. Ayres, Deadwood, president; W. R. Dickinson, Lead, vice-president; Dr. J. A. Ogden, Deadwood, treasurer; Dr. F. M. Gantz, Deadwood, secretary; W. J. McGoffin, Lead, superintendent. The company controls, or claims to, 312 acres of land and is capitalized at $2,500,000 in $1 shares.

PENNINGTON COUNTY.

(*From Our Special Correspondent.*)

Columbia Gold Mining Company.—John Mundt, of Sioux Falls, has settled with the employees of the company on the basis of 90c. on the $1. Owing to the mental collapse of one of the directors, funds were misappropriated and work has been suspended until more funds can be provided. A special meeting of stockholders is soon to be held.

Golden West Mining Company.—A series of test runs are being made in a 5-ton Chilean mill. The company contemplates erecting a stamp mill.

TENNESSEE.

CUMBERLAND COUNTY.

North American Coal Company.—Eugene Hawkins and others, the Central Land and Coal Company, and the Cumberland Coal and Coke Company have transferred 60,000 acres of coal land to this company for $1,000,000.

GREENE COUNTY.

Dickerson Coal Company.—The bursting of a barrel of kerosene on August 8 started a fire which destroyed the Dickerson tipple and machinery of this company near Linton. It will require several weeks to repair the damage. The loss is estimated at $20,000, partly covered by insurance. Nearly 300 miners were thrown out of work, but no lives were lost.

JOHNSON COUNTY.

Empire Lumber and Mining Company.—Iron ore is to be mined by this company on a tract of land in Shady Valley.

POLK COUNTY.

Tennessee Copper Company.—This company at McCays, Tenn., is receiving new machinery for its smelter there to cost between $50,000 and $75,000. Superintendent Haywood says the new equipment consists of one blast furnace, 56 by 180 ins., a new compound Corliss blowing engine, two boilers, 500 h. p., and a large electric lighting dynamo.

TEXAS.

King-Crowther Company.—This company is now in the hands of a receiver, A. C. Pancoast, of San Antonio, appointed by the court, and its offices in Boston, New York, Philadelphia, Chicago, Baltimore and San Antonio are closed. The receiver has not been able to obtain the books from the head office in Boston, whence Mr. King issued his closing advertisements. An order of the court will be issued for them. Mr. Samuel Crowther and other Texas shareholders, it is said, never disposed of the stock issued to them, but advanced money to the company. Only a small part of the stock was held by Texans, and that was issued under an agreement that it should not be sold. Mr. Crowther claims that the Boston men sold not only treasury stock, but much of their promotion stock, while only $60,000 to $70,000 was spent in development. Some seven wells were drilled in McMullen County, 60 miles south of San Antonio; two of these were dry holes and the other five are said to have a small quantity of high-grade oil, and it is questionable if even one barrel was obtained, and certainly none was marketed. Though the company stated that dividends had been paid, not one cent was ever paid to shareholders, it is said, and there is slight hope that they will ever receive a dollar back.

UTAH.

(*From Our Special Correspondent.*)

Ore and Bullion Settlements.—Salt Lake banks reported settlements for the week ending July 31 of $547,800, as follows: Crude ores and concentrates, $246,300; base bullion, $202,000; gold bars, $99,500. Totals for month, $1,829,250.

BEAVER COUNTY.

(*From Our Special Correspondent.*)

Beaver Consolidated.—Manager J. J. Trenan, of Salt Lake, annou ces that at 480 ft. high-grade copper ore was struck. A cross-cut will be run from the 500-ft. level. At the annual stockholders' meeting directors were chosen, as follows: President, J. J. Trenan; vice-president, J. J. Corun; E. H. Jacobs, treasurer, who, with F. Eberhardt and G. M. Palmer, constitute the board of directors; B. L. Corun is secretary. With the exception of Mr. Palmer the officers are local men.

Newhouse Mines and Smelters Company.—Contractor Joseph Dederich, of Salt Lake, is at work on the ditch for the pipe line, 10 miles long, between Wah Wah Springs and the smelter site at Newhouse.

Skylark Copper Company.—Development work has been resumed. A tunnel is being driven.

IRON COUNTY.

(*From Our Special Correspondent.*)

Hope.—This property, in control of a Wyoming syndicate, W. E. Stoddart, of Laramie, manager, is about to install a gasoline hoist.

Johnny.—A new air compressor and machine drills have been installed.

JUAB COUNTY.

(*From Our Special Correspondent.*)

Tintic Shipments.—During the week ending July 31 182 car loads of ore and concentrates were shipped to the Salt Lake smelters, as follows: Bullion-Beck, 13; Carisa, 3; Centennial-Eureka, 36; Eureka-Hill, 10; Gemini, 11; Grand Central, 32; La Clede, 1; Lower Mammoth, 2; Star Consolidated, 4; Richmond-Anaconda, 1; Uncle Sam Consolidated, 1; Victor Consolidated, 3; Yankee Consolidated, 10; Black Jack, 19; Drogon Iron, 30; Noon's Iron, 4; May Day, 2.

PIUTE COUNTY.

(*From Our Special Correspondent.*)

Annie Laurie.—Pending changes in the mill, the mine has closed for several weeks.

L. & N. Group.—Col. S. F. Mount, of Marysvale, who recently secured a bond and lease on this property, reports having struck telluride gold ore in a new shaft sunk at 35 ft. The vein is reported about 4 ft. wide and ore is being sacked.

SALT LAKE COUNTY.

(*From Our Special Correspondent.*)

Bingham Consolidated Smelter.—Copper bullion shipments for the week ending July 31 amounted to 5 cars, or 300,000 lbs.

Highland Boy Consolidated.—Superintendent W. B. Smith, of Bingham, claims that he has blocked out 1,000,000 tons of ore. The company has a dispute over apex rights with the Utah Consolidated, Petro and Tintic companies, but all have agreed to settle without going to court.

Silver Shield.—A good grade of ore is reported in the tunnel in this Bingham mine.

Tintic County.—Work is being pushed on the Yampa smelter at Bingham. Consulting Engineer James W. Neill expects the plant to be ready sometime in October.

United States Smelter.—Shipments of copper bullion for the week ending July 31 were three cars, or 180,282 lbs.

Utah Consolidated Smelter.—Copper bullion shipments for the week ending July 31 were five cars, or 360,750 lbs.

Utah Copper Company.—Manager D. C. Jackling expects to have the concentrating plant ready by January 1.

TOOELE COUNTY.

(*From Our Special Correspondent.*)

Eureka-Ophir.—This company, J. W. Cairns, of Gisborn, manager, has leased the Mono Mill to treat its lower grade ores, and is concentrating eight tons into one.

Stockton.—This company has about concluded ar-

rangements with the Honerine Mining Company, which is planning to erect a concentrator of 500 tons daily capacity, and will deliver its milling ores to the Honerine plant for one year. On the 500-ft. level six milling ore shoots are reported developed. At a meeting of the stockholders, this week, G. M. Palmer, of Mankato, Minn., was elected a director to fill a vacancy.

WASHINGTON.

FERRY COUNTY.

Lucile Dreyfus Mining Company.—Suit has been brought to cancel 982,000 shares of false and raised certificates sold by Howard J. Kressly, the absconding secretary.

WEST VIRGINIA.

MONONGALIA COUNTY.

Clinton Coal and Coke Company.—This company has bought 10,000 acres of coal land near Morgantown, and will build four miles of railroad to develop it; also 800 coke ovens. The capital of the company has been increased to $1,000,000.

WYOMING.

CARBON COUNTY.

Doane-Rambler.—A 12-in. streak of black oxide of copper in a quartz vein is reported struck in the lower tunnel, and in the Aetna tunnel there are said to be 18 in. of high-grade ore.

FOREIGN MINING NEWS.

CANADA.

BRITISH COLUMBIA—BOUNDARY DISTRICT.

B. C.—Shipments have stopped for the present. The last week of July 600 tons were shipped to the Greenwood and Sunset smelters.

Granby Smelter.—The two new furnaces are about completed. The smelter will be closed about ten days to blow them in.

Oro Denoro.—This property, which recently resumed, after three years' idleness, shipped 420 tons to the Sunset Smelter the last week in July.

BRITISH COLUMBIA—CARIBOU DISTRICT.

It is reported that coal lands on which there are 250,000,000 tons of coal have been located in the district near Hudson Hope, near the entrance to the Peace River Pass.

BRITISH COLUMBIA—CARIBOU DISTRICT.

Great Northern.—This mine is being unwatered.

Nickel Plate.—This mine is reported unwatered to the 600-ft. level. Baling tanks are used at less cost than pumps.

White Bear.—Two water rights have been secured for this mine aggregating 140 in. The compressor building is completed and awaiting the machinery.

NOVA SCOTIA—CAPE BRETON.

Sydney Mines.—The coal production for the month of July showed a decrease of 2,000 compared with the previous month. The total output was 38,754 tons.

ONTARIO—SUDBURY DISTRICT.

The northern nickel range is being explored by Prof. A. P. Coleman, of Toronto, to ascertain the relationship between nickel bearing eruptive rocks and the ore deposits. He has covered nearly all the range.

MEXICO.

COAHUILA.

La Union Mining Company.—New York men have leased the La Salvador and La Porvenir mines near Barroteran, from this company, for five years on a royalty on all ore taken out.

DURANGO.

Descubridora.—It is reported the Guggenheims have an option on these copper mines for $8,000,000. This is said to include the Durango Central Railroad from Conejos to the mines, over 30 miles. The principal owners are Pennsylvania and New York people. T. H. Watkins, of Scranton, Pa., is president. F. C. Ross is secretary, and David Gough is general manager at Descubridora.

GUERRERO.

Huitzuco.—New Yorkers have acquired these quicksilver mines, which have been considerably developed and have a reduction plant with six furnaces.

JALISCO.

Ampara Mining Company.—This company has paid the balance due on the Santo Domingo Mine in the Etzattan District, and assumed possession.

SONORA.

Jaurez.—A rich vein of gold ore was struck in this mine, in the Montezuma District, and a company is to be organized to work it.

MINING STOCKS.

(Full quotations are given on pages 259 and 260.)

New York. Aug. 13.

This week has seen another scale of low prices, and at times the market drifted, only to be stemmed again by professional operators. The situation continues to be a perplexing one, as practically no demoralizing rumors are afloat that could influence the market. On the contrary, bright hopes are entertained for the fall trade, which lend an undercurrent of strength to the stock market.

The copper securities have again been under pressure. Amalgamated, as usual, was the target, and, lacking inside support, dropped to within 2 points of the lowest on record. On Thursday, August 6, the extreme prices were $37 and $39⅞, on sales for the day of 32,420 shares. Subsequently the bears let up a little and sales fell off, but prices advanced from $37⅜ on Saturday to $40½ on Tuesday. Anaconda showed nearly the same course, but on a smaller scale. Its extreme prices were $16 2-3 and $17.22, closing on Tuesday at $17⅛. On curb the market looked weary, and sales were too small to cause comment. Greene Consolidated, of Mexico, received some attention from the report that certain Amalgamated interests have recently become large holders of the stock. The Greene shares were secured, it is said, on loans made to the company. It is also hinted that the Amalgamated Copper Company may take the Greene properties under its wing. This, of course, must be proved by developments other than hearsay. Momentarily Greene shares are selling sparingly at $16⅝@$15¾. Tennessee changed hands at $28¼@$28, and United, of Montana, at $16¾. British Columbia appears to be in the dumps at half the par value.

The Colorado gold shares show more attention, but prices are weak, particularly for the Cripple Creeks. Vindicator Consolidated, paying 20 per cent. on its par value of $1, has reached 75c. Elkton Consolidated offers at 46c., while Isabella is selling at 10c. Iron Silver, of Leadville, upon declaration of a third quarterly dividend of 10c. per share, changed hands at $1.70.

The Comstock stocks displayed another line of assessments, the latest being 25c. on Consolidated California & Virginia, and 10c. on Hale & Norcross. Consequently prices are off. Sales of Consolidated California & Virginia are reported at $1.45, of Ophir at $1.75@$1.70, Mexican $1.30, and Best & Belcher $1.95.

The industrial stocks are slow in recovering from the recent demoralized market, because inside support is not yet sufficient. Perhaps, after the vacations, prices will again recover, at least stockholders hope so.

Boston. Aug. 11.

(*From Our Special Correspondent.*)

Price changes in mining shares in this market have been unimportant the past week. However, there is a more confident feeling, and a little encouragement might bring about some long commitments. Boston brokerage houses are in a good position financially, and no trouble is looked for from this source. As one broker put it: "We are as easy as an old shoe." This application about fits the majority of cases, as copper shares have been dragging at low figures for some time. Speculation at this center has been at low ebb for a long period, and brokers have not had to seek accommodation. This is well, for it is doubtful if banks would look with favor upon coppers as collateral.

It really looks as if mining stocks might gradually work away from Amalgamated influences, which would be a victory ultimately for coppers. On the other hand, it is felt that Amalgamated interests have acquired large holdings of some stocks, principally Tamarack, Osceola and Copper Range.

Tamarack fell $5, to $75, but sold at $84 to-day and then $80. A gradual improvement is reported from the mine. Osceola has varied from $50.50 to $49.50. Copper Range is next to Amalgamated, in fluctuating, although less this week than at previous times. The extremes have been $42.25@$39.50, closing at $41.25. The Champion, of which Copper Range is a one-half owner, is expected to declare a third $1 dividend at an early date. Mohawk fell $1, to $34.50, but recovered. Parrot broke $1.50, to $17, but recovered the loss. Bingham has been extremely quiet at $21.25@$22. Utah Consolidated slid off $1.12½, to $23, but easily recovered to $24.37½. United States to $16.50, but has recovered to $17.50. Dominion Iron made its low record at $8, but has recovered to $9. Dominion Coal showed particularly violent fluctuations Thursday last. After settling $11, to $77, it rose sharply to $85, the same day, closing the week at $84. The cause of the movement was not explained.

Wolverine holds steady close to $62@$63, and Atlantic at $8.25@$8.50. Centennial moves rapidly at times. This week it fell to $14, and recovered to $15.50. Old Dominion rose from $10.50@$11.75. The July product of the latter is estimated to have been about 700,000 lb., against 600,000 lb. for June. Arcadian touched $1.75 on the announcement that all operations at the mill have been suspended. Calumet & Hecla holds at $420@$425. Tri-mountain touched $78. A list of the shareholders shows that T. W. Lawson has almost 27,000 shares in the names of his clerks. A list of Calumet stockholders shows the largest holder to be Quincy A. Shaw, of this city, with 5,500 shares, while Alexander Agassiz holds 4,904 shares.

Colorado Springs. Aug. 7.

(*From Our Special Correspondent.*)

The mining stock market closed strong and with promise of better things for next week. The decision just handed down by the Colorado courts that the taxation of Cripple Creek mining properties during the past three years has been excessive, and ordering a reduction from 10 to 90 per cent of the taxes assessed had a good effect.

El Paso re-entered the dividend-paying list August 1, as predicted in this letter several weeks ago, and will pay a ½c. dividend August 25. The stock sold at 58½ and down to 58, but recovered to 59½, where it closed to-day. Elkton Consolidated sold at 41 all the week, closing stronger to-day at 41½ bid, with 44 asked. Portland, which was weak and unsatisfactory a week ago, has improved somewhat. On August 1 it was quoted at $1.15 bid and $1.25 asked, but rallied during the week, selling to-day up to $1.21, the high mark. As to the balance of the market, there was little worthy of note.

Salt Lake City. Aug. 8.

(*From Our Special Correspondent.*)

This has been a bad market week and very few stocks called on the Salt Lake Stock Exchange escaped being pulled down in price. Brokers had few orders from clients to execute. Nearly all the Park City traders are quoted lower, particularly New York, which has depreciated at least one-third. California ended the week slightly improved. Of the Tintic stocks, May Day suffered the most serious setback. Silver Shield, the Bingham stock which advanced a week ago, on account of a strike made in the mine, is back again to about the price which prevailed prior to the rise.

The total sales of the week on the stock exchange amounted to 142,202 shares, selling for $41,117.

San Francisco. Aug. 8.

(*From Our Special Correspondent.*)

There was a somewhat stronger feeling in the Comstock shares early in the week; but buying fell off, and prices generally weakened. Business is tending towards slackness, and outsiders are generally out of the market.

Ophir sold from $1.90 down to $1.70. Consolidated California & Virginia brought $1.65@$1.50; Mexican, $1.50@$1.30; Yellow Jacket, 74c.; Sierra Nevada, 70@60c.; Gould @ Curry, 50@40c.; Hale & Norcross, 55c.; Potosi, 25@20c.

On the San Francisco & Tonopah Exchange business was fair, but rather lighter than for several weeks past. Prices, however, were fairly steady. Tonopah Belmont brought $1.90@$2; Tonopah North Star, 51c.; McNamara, 20c. In the California stocks there were sales of Eureka at 80c.

On the Oil Exchange business was quiet and buyers rather held back. Prices eased off a little. Home Oil sold at $2.85@$2.90; Monte Cristo, 90c.; Four Oil, 65@70c.; Lion, 5c. The tendency was rather towards the low-priced stocks.

COAL TRADE REVIEW.

New York, Aug. 13.

ANTHRACITE.

The anthracite coal trade, though still calling for a heavy tonnage, shows less activity, as the pressing wants of dealers and consumers are about supplied. The shipment of 5,377,495 tons in July and 5,436,497 tons in June has taken away all urgency. The shipments compare with 92,203 tons in June and 250,079 tons in July last year. The total for this year to date is 37,250,969 tons, or over 6,000,000 tons in excess of the figures for the corresponding period of the record breaking year 1901.

The Conciliation Board that is adjusting differences between miners and operators has asked for the appointment of a seventh man as umpire under the award of the Strike Commission which directed that if the representatives of the miners and the operators could not agree an umpire should be named by one of the judges of the Third Judicial Circuit, the award of this umpire to be final and binding on both parties. It is hardly likely that the miners' leaders will attempt to evade the umpire's rulings.

In the West trade is quieter than it has been. Ship

ments of anthracite up the Lakes have been liberal and receipts at the head of the Lakes are expected to be heavier during August than they were in July. A heavy tonnage is going from the docks to country yards. Stove coal seems to be the size most wanted. In Chicago territory demand has fallen off somewhat and is now about what it was in August, 1901. Demand from country yards is still fairly good. Dealers expect no improvement until the season of regular fall buying starts. Along the lower lakes and in Canadian territory demand is quieter. Along the Atlantic seaboard also it shows a falling off. It was quiet all through July at New York and August is not likely to see any improvement. At points beyond Cape Cod coal is arriving fast enough to about meet the wants of dealers, the demand from New England points being remarkably strong. Fogs and bad weather have interfered to some extent with the coastwise movement of coal. The accumulation of steam sizes has broken the market, so that at Philadelphia the Philadelphia & Reading Company has cut its contract figures to 50c. below circular on line and city deliveries for pea and buckwheat during August. There has been no corresponding cut at New York Harbor points, but freshly mined buckwheat is reported selling for $1.50 per ton alongside.

BITUMINOUS.

The Atlantic seaboard bituminous trade is still quiet. The prevailing car shortage is felt rather seriously by the producers of the higher grades of coal, some of whom are having difficulty in supplying their regular trade. The producers of the lower grades are not bothered much, since the demand for their output is light. The railroads contend that there is no real shortage of cars, but admit there is a lack of motive power. When producers of the higher grades complain of car supply being bad indeed, the railroads usually give better supply for a while. There is no strike of any importance anywhere in the mining region. The New River strike, which had existed, nominally at least since July 7, 1902, was declared off recently; the miners gained nothing.

Trade in the far east is fairly good, shippers receiving a moderate supply of orders from this territory, especially from dealers supplying mills in districts where water power is limited. Along Long Island Sound trade continues dull, although demand for the better grades has apparently improved since car supply affected the output. At New York Harbor points trade is very quiet, ordinary grades of Clearfield selling for $2.5 and $2.60 f. o. b. New York Harbor shipping port. Transportation from the mines to tidewater is good, coal coming through in less than a week. Car supply is very variable, averaging from 35 to 40 per cent of the demand. In the coastwise vessel market there is a fair tonnage available even of smaller vessels, and the endeavor to increase rates is not likely to bring results. We quote current rates of freight as follows from Philadelphia: Boston, Salem and Portland, 90@95c.; Providence, New Bedford and Long Island Sound, 70@75c.; Lynn, $1@1.10; Newburyport, $1.15; Saco, $1.20 and towages; Gardiner and Bangor, $1.10. Rates from the further lower ports are 5c. higher. From New York Harbor rates for large vessels are 80@85c. to Boston, Salem and Portland, and 60@65c. to Providence, New Bedford and Long Island Sound. For small craft rates are $1.05@1.10 to Boston, Salem and Portland and 65@70c. to Providence, New Bedford and Long Island Sound.

Birmingham. Aug. 10.

(*From Our Special Correspondent.*)

As the mine workers become accustomed to work again, after a month's idleness, the production grows. The board of arbitration is considering the differences between the coal operators and the miners. Judge George Gray, of Delaware, and T. L. Lewis, the national vice-president of the United Mine Workers of America, are here. Should the board fix a wage scale higher than the old scale the operators are to pay the difference to the miners from the day the latter began work. If the arbitration board should make an award favorable to the operators, then the miners will have to repay the amount paid them in excess of the old scale. The condition of the iron market, the price of iron, and many other matters will be brought before the arbitration board.

There is a good demand for coal and shipments are already heavy. Pensacola, Mobile and other gulf points are requiring much coal.

There is considerable development going on. It is said that six or eight new coal mines will be in operation by October 15.

There is a strong demand for coke. Labor is a little scarce about the ovens, but the supply is improving.

The Lucile Coal Company, operating small mines in Bibb County, is having trouble in the Courts and a hard fight is on before the Referee in Bankruptcy.

Chicago. Aug. 10.

(*From Our Special Correspondent.*)

There is a noticeable slackening of the anthracite trade, both of wholesalers and retailers, with the coming of August, the dullest month of the year for the local coal market. The rush to lay in stocks is apparently over; henceforth it is probable that the trade will be more nearly normal for the season than it has been heretofore this year. It looks as if consumers have become generally supplied for the winter; retailers find their trade falling off, both in city and country. The anthracite business has by no means ended, however; the reaction is only to normal conditions. There will be doubtless a quiet, steady trade until winter, when the heavy demand due to immediate needs, will set in again. Possibly the end of August will see something of a rush again to get orders in before the final advance to September prices, but this can hardly be expected to be anything like the heavy accumulation of orders at the end of previous months.

The bituminous trade continues slack, as is natural for the season. Smokeless is decidedly dull; the actual price is difficult to determine, on account of the competition and eagerness to sell; nominal quotations have been $3.75@$3.90; Hocking maintains its popularity and will advance 25c. on the middle of the month; nominally it is now at $3.50; but there has been considerable Hocking on track in the last week, which is now being disposed of; Indiana and Illinois coals are in better demand than last week, lump selling at $2@$2.50 and block at $2.15@$2.65. Youghiogheny is in better demand, at $3.50@$3.70.

Cleveland. Aug. 11.

(*From Our Special Correspondent.*)

The coal shippers of this territory have been saying that because of a scarcity of coal they are compelled to advance prices. The railroads have punctured this statement by making it known that coal is plentiful, if unloaded, and to-day brought a claim for demurrage against some of the shippers, because the cars were being delayed. The contention has been lively but without tangible results, except that the shippers have deferred action in advancing prices. The statements have been made as to the coal movement for the first half of this year, showing that the Ohio shipment, over the roads controlled by the Ohio Coal Traffic Association, has been about 7,000,000 tons, an increase over the corresponding period of last year of 200,000 tons. The increase in the movement to the lakes from the Ohio fields has been about 175,000 tons. The movement from the Pittsburg and the West Virginia fields has been much heavier.

The lake rates are steady and the movement light. In some instances vessel owners are shading the rates of carriage, to be able to get better dispatch from favorite docks. In one instance the cut was made from 50c. to 45c. from Buffalo to Lake Michigan points because of the advantages being given in dock facilities. The general lake situation is easier, thus producing easier conditions in the coal trade. No new sales of ore have been made, the market in that respect being quiet. Lake coal prices hold at $2.45 for Pittsburg and West Virginia lump as a basis and $2.35 for Ohio lump as a basis.

Pittsburg. Aug. 11.

(*From Our Special Correspondent.*)

Coal.—The shortage of railroad cars for the coal trade has become serious and many mines are idle this week. The shipments to the lakes for the northwestern trade has fallen off considerably and it is doubtful now if the Pittsburg Coal Company will be able to fill all of its contracts. The shipments since the opening of navigation were very heavy, and despite the car shortage the shipments this season will be much greater than last year. Prices are firm, and no shading is being done by any of the companies. If there is no improvement in the situation, it is likely that premiums will be charged on new business. All the mines of the Monongahela River Coal & Coke Company are in full operation, there being enough empty coal boats and barges in the pools and harbor to keep them going for a month or two.

Connellsville Coke.—Coke shipments are bad this week, on account of a car shortage, but the furnaces are not crippled, as many provided for such a contingency and stored coke when it was more easily obtained. The price remains unchanged, furnace coke being quoted at $3 and foundry at $3.50. It is reported that some sales of foundry coke were made last week for immediate delivery at $3, but contracts could not be made at that figure. The *Courier* in its last issue gives the production for the previous week at 253,678 tons. The shipments were 12,024 cars, distributed as follows: To Pittsburg and river tipples, 4,421 cars; to points west of Pittsburg, 5,492 cars; to points east of Connellsville, 2,111 cars.

San Francisco. Aug. 8.

(*From Our Special Correspondent.*)

There is no change to report, except that arrivals of coast coals continue good. Prices are steady.

Yard prices for Pacific Coast coal to dealers in large lots are as follows: Wellington and New Wellington, $8; Richmond, $7.50; Roslyn, $7; Seattle, $6.50; Bryant, $6.50; Coos Bay, $5.50; Whiteash, $5.25. Rocky Mountain coals in large lots, ex-car, are quoted at $14 for Colorado anthracite and $8.50 for Utah and Wyoming coals. Eastern coal is scarce, but quotations remain nominally at $14 for Pennsylvania anthracite and $13 for Cumberland in cargo lots. Foreign coal sells in large lots as follows: Welsh anthracite, $13; cannel, $8.50; Brymbo and Wallsend, $7.50.

Foreign Coal Trade. Aug. 13.

There is nothing new here, either in imports or exports.

Imports of fuel into Belgium for the first half of the year are reported as follows, in metric tons:

	1902.	1903.	Changes.
Coal	1,514,291	1,711,190	I. 196,899
Coke	89,489	157,436	I. 67,947
Briquettes	13,129	17,661	I. 4,523
Totals	1,616,909	1,886,287	I. 269,378

Exports from Belgium for the same period are reported as follows:

	1902.	1903.	Changes.
Coal	2,075,764	2,247,079	I. 171,315
Coke	378,805	397,742	I. 18,937
Briquettes	302,704	329,170	I. 26,466
Totals	2,757,373	2,973,991	I. 216,618

The coal trade of Belgium is chiefly with adjoining countries—France, Germany and Holland.

According to a British consular report, in 1902 the total import of British coal and coke into Bordeaux was 916,226 tons, being 47,874 tons more than in the previous year, and 248,066 tons more than the average annual amounts imported during the five years 1897-1901, which was 668,160 tons. The increase in the imports of coal has been very great and very regular, being in 1902 very nearly double the amount reported in 1897. In 1902 there was 23,126 tons of coal imported into Bordeaux from the United States, Germany and Belgium.

According to the report of the British Consul at La Rochelle the annual contract for 100,000 tons of hard steam coal for the French State railway during 1902 has been in the hands of a South Wales firm, and for 1903 the contract is renewed with the same firm for 80,000 tons of steam coal and enough small coal and coal-pitch to make 50,000 tons of briquettes, which will be manufactured at the new patent fuel factory at La Pallice-Rochelle, for delivery to the State railway during 1903.

Messrs. Hull, Blyth & Co., of Cardiff and London, report, under date of July 31, that the general condition of the Welsh coal market is unchanged. Owing to the August holiday, the output will be very limited next week and coal consequently scarce. Quotations are: Best Welsh steam coal, $3.90@$3.96; seconds, $3.78; thirds, $3.60; dry coals, $3.30; best Monmouthshire, $3.30@$3.48; seconds, $3.30; best small steam coal, $2.16; seconds, $2.04; other sorts, $1.92.

The above prices for Cardiff coal are all f. o. b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f. o. b. Newport, exclusive of wharfage but inclusive of export duty, and are for cash in 30 days, less 2½ per cent discount.

Freights.—The freight market is unchanged. Rates weak. Some rates quoted from Cardiff are: Marseilles, $1.20; Genoa, $1.14; Naples, $1.14; Singapore, $2.52; Las Palmas, $1.44; St. Vincent, $1.56; Rio Janeiro, $2.28; Santos, $2.52; Buenos Aires, $1.92.

IRON TRADE REVIEW.

New York, Aug. 12.

A greater movement of raw material is reported this week than for some weeks past. There has been more buying, but most of it has been at lower prices than have been made before this year. The waiting policy has been successful to a certain extent. The present movement does not indicate that it has been abandoned, but rather that consumers have arrived at the bottom of their stock-piles and find it necessary to secure more material. Gray forge has sold rather freely in Pittsburg at $16, Valley furnace, while there have been considerable transactions in No. 2 foundry around $17.50, Valley; in some cases it is reported that $17 has been done. This business amounted in the aggregate to a considerable quantity, although individual orders were only of moderate size. Buyers are no longer afraid to wait, as under present conditions they can secure almost any delivery which they want. No large contracts for third-quarter iron have been placed. Bessemer pig has shown no movement: the buyers are apparently waiting for the

action of the United States Steel Corporation, which has not yet made its outside purchases.

Southern iron has sold only in comparatively small lots. The outside furnaces have been selling No. 2 foundry at $12, f. o. b. Birmingham, without any concealment. This is $1.50 below Association prices, and naturally has taken most of the business going.

Steel billets have sold in the same way as pig iron, that is, in moderate lots for early delivery. Most of the sales have been at the Association price of $27, Pittsburg. Current report is that billets are to be had for almost any delivery, the steel mills having rather a surplus at the present time. In finished material the story is very much the same, buyers taking more freely, but generally in moderate lots for nearby delivery. Bars, plates and merchant steel are rather dull, the greater demand being for sheet iron—especially galvanizing sheets—wire and nails. The structural trade seems to have been killed for the season, demand being rather light.

Production is temporarily smaller in finished material, as many mills are making their yearly stock for repairs. It is also smaller in pig iron, as several furnaces in the Pittsburg district and in the Valleys have been obliged to blow out for repairs, after long and hard campaigns. Complaint is again heard of slow deliveries of coke. Many furnaces accumulated a fair stock in June and July, but, unless transportation improves, these stocks will soon be exhausted and trouble may be looked for.

Birmingham. Aug. 10.

(From Our Special Correspondent.)

There is little, if any, improvement in the pig iron market. Consumers are still holding off strong, in the hope of cheaper iron. There is still an accumulation of iron, though during July, as a whole, the production declined. Some furnacemen assert that they are receiving more orders than during the last four or five weeks, but the orders continue small. As far as can be learned, no further reduction in quotations is contemplated in the near future, though all indications are that the prices will again fall, as consumers seem confident they will be able to get their iron as they need it, and at prices every bit as low as now.

The new furnace of the Central Iron and Coal Company, at Holton, in Tuskaloosa County, is in operation and in a short while should produce 200 tons of iron daily. The Sloss-Sheffield Steel and Iron Company has five of its seven furnaces in operation. The Woodward Iron Company is not making any iron. The Lacey-Buck Company has its furnace out, as well as the Tutweiler Coal, Coke and Iron Company. The Tennessee Coal, Iron and Railroad Company has three or four furnaces out and other furnaces in the district are idle.

The following quotations are given: No. 1 foundry, $14; No. 2, $13.50; No. 3, $13; No. 4, $12.50; gray forge, $12 to $12.50; No. 1 soft, $14; No. 2, $13.50.

The big steel plant of the Tennessee Coal, Iron and Railroad Company, at Ebsley, is working steadily, with the mill department on double turn. Southern railroads are beginning to look to this section for rails. The Alabama Steel and Wire Company's steel rod, wire and nail mills, at Ensley, remain closed. It is likely that the plant will not resume until the company is making its own steel at Gadsden, which will not be before next year. The Gate City rolling mills, owned and operated by the Republic Iron and Steel Company, have resumed after five weeks' idleness. The Bessemer rolling mills, belonging to the Tennessee Coal, Iron and Railroad Company, will resume this week, except in the plate mill department.

Machine shops and foundries are busy. Some of the proprietors announce that they have been receiving nice jobs lately, with prospects of more this fall.

Chicago. Aug. 10.

(From Our Special Correspondent.)

There is a notable improvement in the pig iron market, which seems to selling agents to catch the least breath of favorable wind, the beginning of the end of the long period of stagnation that has afflicted the trade. Foundrymen have at last got to the point where they are either tired of waiting for a lower market, or their needs have become too pressing to allow continuance of the hand-to-mouth policy of buying. At any rate they are buying again, with comparative freedom. Many small lots are still sold and are in demand, but larger orders and inquiries are coming in; one sale of 50,000 tons is reported, and is said to have been made at $17.50. The market continues to be based on nominal quotations of $12.50@$13.50 for No. 2 Southern, Birmingham, or $16.85@$17.85 Chicago, with Northern practically the same as Southern for similar quality; the Southern association quotation of $13.50, Birmingham, is openly cut by the independent furnaces, and sales have probably been made as low as $12. To all appearances $16.35 represents the lowest point in the depression, at Chicago; the revival of the needs of the trade means a stiffening of prices in the near future, as representative men in the trade see the situation. The indications are that the comparative briskness of last week, which began with the malleable trade, is spreading to all branches of the iron industry, and from the first day's record of the current week, it seems safe to prophesy for this week double the business that was done last week by sales agents.

Coke continues abundant and with no change as to prices or conditions of delivery.

Cleveland. Aug. 11.

(From Our Special Correspondent.)

Iron Ore.—There is no appearance of further ore sales, as has been expected, and the shippers by lake are beginning to contract the wild movement of material. Boats in the lake trade are therefore easier to obtain and the rates are soft. The market shows no sign of a change. The quotations on carrying charges are still: 80c. from Duluth, 72½c. from Marquette, and 60c. from Escanaba. The prices of ore have not changed, being $4.50 for bessemer old range, and $4 for bessemer Mesabi.

Pig Iron.—The demand for foundry pig is light, being confined to hand-to-mouth ordering to meet immediate requirements. The furnaces are asked to trace all cars sent out that prompt delivery may be assured. Many of the stacks are out of blast for repairs, but the idle capacity is not seriously missed. The producers are quoting $17 in the valleys for No. 2. Southern producers are cutting under prices made by the associations. The non-association stacks in the Birmingham district are quoting $12, Birmingham, while the association furnaces of that same region have refused to do better than $13.50, Birmingham, for the same material. In all pig iron production in this territory has been heavy, the stacks having plenty of coke. The shipments have been commensurately large, permitting only the minimum of storage in this territory. Bessemer producers have dropped their prices to $18 in the Valley for immediate shipment. It is understood that they would willingly make fourth-quarter contracts on that basis, but the whole market is holding for lower prices, which is a part explanation of the lack of forward buying. Basic is inactive, no inquiries appearing for that material. The price also sags, and is now quoted at $18 in the Valley; but buyers look for at least $1 lower.

Finished Material.—The bar market has continued to develop weakness in every branch. The hammering of steel prices has not ceased, although it has been without avail. The lack of ordering attests the weakness of the trade. The larger mills are protecting their big customers by guaranteeing prices against a decline. Even this does not convince the weaker buyers, who are still holding for lower prices. The steel prices are 1.60c. Pittsburg for bessemer and 1.70c. Pittsburg for open-hearth. Bar iron prices are subject to local conditions, being quoted 1.60c.@1.65c. Cleveland. Structural demands are very light and the trade is dull. The jobbers are getting the minimum amount of business and the mills are able to make general orders of about any size demanded, inside of three or four weeks. The trade is not up to last year. The price holds at 1.60c. Pittsburg from all mills and 2.15c. out of stock. The plate situation is also weak. Some of the mills are out of operation for repairs, but the idle capacity is not seriously missed. The smaller mills are either getting along with limited business or have suspended, while awaiting a more brisk market. Association prices have not been cut, so far as known. The larger mills continue to ask 1.60c. for prompt shipment. Sheet prices are being shaded on choice orders of good tonnage. The market is not over brisk, and in many instances the smaller mills have been forced to suspend operations because of slackened business. Orders given have not been cancelled, but the mills are not able to get enough new business to keep them going. The prices are still based on 3.05c. out of stock for No. 27. The billet trade has been light, with but little being done. The mills have not been buying heavily at the new price of $27.50 Pittsburg. Rails are in light demand, but shipments on old contracts have been heavy. It is apparent that some of this material cannot be delivered on this year's contract and will be carried over.

New York. Aug. 13.

Pig Iron.—The market is still quiet and prices are down. For Northern iron at tidewater prices are: No. IX foundry, $17.50@$18; No. 2X, $16.50@$17, while No. 2 plain can be had for 50c. less; gray forge, $15.50@$16. For Southern iron, on dock, quotations are: No. 1 foundry, $17; No. 2, $16.50; No. 3, $16.

Bar Iron and Steel.—There is no improvement. Prices for large lots on dock remain: Refined bars, 1.80@1.90c.; soft steel bars, 1.75@1.90. Trade is chiefly of a retail order.

Plates.—Business is mostly in small orders. Sheared plates are quoted as follows: Tank, ¼-in. and heavier, 1.80@2c.; flange, 2@2.05c.; marine, 2.10@2.20c.

Structural Material.—The outlook for improvement in the local building trade is still poor. For large lots at tidewater, nominal quotations continue 1.75@2c. for beams, angles, channels and tees. The usual advance is asked for small lots out of stock.

Steel Rails.—The quotation remains $28 for standard sections, f. o. b. mills; light rails, $33@36, according to weight. Relaying rails are $28@$33 for heavy sections and $33@$35 for light sections. Demand for rail-fastenings is good.

Philadelphia. Aug. 12.

(From Our Special Correspondent.)

Pig Iron.—During the past few days there has been a freer buying of all kinds of crude iron in eastern and middle Pennsylvania, though considerable caution is still manifested in the quantities purchased. The furnace interests which for some time past have been crowding iron on the market are less urgent this week, anxious as ever to make sales. The needs of small consumers are more apparent, and makers look for a better tone to the market. Some sellers have made sales this week considerably under market quotations, while others are adhering to their regular rates. For this reason quotations do not mean much. The stronger concerns are waiting for the weaker to get tired, and there are signs that the available amount of cheap iron is narrowing down. The quotations given by the strong companies may be given tentatively as follows: No. 14 Foundry, $18@$18.25; No. 24 Foundry, $17.25@$17.50; No. 2 Plain, $16@$17; Standard mill irons, $16.50@$17; ordinary, $16; basic, $16@$16.50, all delivered; but business has been done considerably below these figures.

Billets.—Attempts are being made this week by two or three large consumers to close up business that has been dragging along for weeks, but there is quite a difference between the offer of buyers and the price of makers. It was said on the street to-day that something under $28 will be the price for basic open-hearth. In a small way, $28.50@$28.75 was paid.

Merchant Bars.—Cutting is going on, and it is strongly hinted to-day that the few mills that have been standing out for fair margins will meet the cutters' rates and drive them to the wall. Steel bars weakened and 1.70c. is quoted. Offers have been made to car-builders at very low rates, but they have not accepted.

Skelp.—The eastern skelp mills are getting short of work and one or two will shut down September 1.

Pipes and Tubes.—This branch of the trade holds up well, and orders from beyond our territory keep coming in. The local requirements are showing up well, particularly for tube work, and prices are in favor of makers.

Nails.—A better demand is spoken of by sellers. Stocks are sufficient to meet all demands, and factories are able to make prompt shipments.

Plates.—The rush for plates has subsided. Tank is quoted at 1.80@2c.; fire box, 2.30c.

Structural Material.—The mills are running along as usual, but midsummer business has been of moderate proportions. Some few local requirements were promptly snapped up as soon as presented and early deliveries promised. This business was done at top prices, as all small business in ordinary sizes of beams, angles and channels are quoted at 1.80c. in a large way.

Steel Rails.—More business in light rails was dispatched this week and railmakers say that quite a sprinkling of orders is coming along. Two or three lots were ordered at $38.

Old Rails.—Old steel rails are quoted at $19, and iron at $20.

Scrap.—Scrap is down again and very little changed hands this week. Heavy steel is held at $18.50 and stocks are accumulating. Low phosphorus scrap is scarce, but is not much called for. No. 1 wrought is down to $18.25; machinery scrap, $17.25; choice wrought turnings, $13.50; No. 2 light scrap, $17.

Pittsburg. Aug. 11.

(From Our Special Correspondent.)

The improvement in the iron and steel market continues, although there has been no sales of bessemer, but some good-sized orders for forge and foundry iron have been received. A number of mills are still closed for repairs, and there is no special demand for iron at this time. Buyers may have decided to remain out of the market pending the action of the United States Steel Corporation pig iron committee, which is scheduled to meet to-day to consider buying more iron. It had been announced that the meeting

would occur yesterday. There is considerable speculation here as to what will be done. Persons interested in the market doubt that iron will be bought for the fourth quarter, as under present conditions there is no necessity for placing orders for extended shipment. From the outlook now there will be enough outside iron available for all the Corporation's requirements. All buying that will be done, if any, according to one authority, will be for delivery during this and next month. There is no certainty that after sizing up the situation it will be found necessary to make a large purchase. The policy of the Corporation now is to buy iron when it is needed. The third-quarter purchase made a month or two ago at $18.50, Valley furnace, which was then considered to be a low rate, has been found to have been a mistake. This is shown by the sales of bessemer made during the past two weeks at $17.50, Valley, or $1 a ton less than the corporation is paying for deliveries made on the last contract. The trade is not so much interested in the tonnage the Corporation will take, as in the price that will be made. Any purchase that may be made will fix the general market price. Furnaces do not seem disposed to cut under the ruling quotations, and if the price is shaded there is but little probability of a lower rate than $17, Valley. The only grounds, however, for this belief is the fact that a number of Valley furnaces have been blown out for relining, and several more are going out this month for repairs. The indications now are that the production of pig iron for the second half of the year will not be as heavy as the first half. Gray forge has reached the lowest point of the year, a sale having been made at $16, Pittsburg. Some sales of foundry No. 2 have been made the minimum price, being $17.50, Pittsburg.

A serious congestion in transportation is considered almost certain, as there is now a shortage of cars, particularly for coke. Heavy ore shipments and the increasing movement of merchandise are beginning to tax the railroads to their greatest capacity. Efforts are being made to avoid blockades, that so seriously hampered transportation early in the year.

The general conditions in most of the finished lines are good, particularly in steel bars. There has been a steady growth in new business due to the guaranteeing of prices which has increased confidence. Prices of plates are being well maintained, although there is not much new business coming in. Concessions in sheets are not so easily obtained as a week or two ago and the market seems to be improving. Orders for 30,000 tons of steel rails were placed by western roads during the week. Some large orders for eastern roads, which have been in the market for some time, have not yet been placed. The market for structural material has been affected by building trades disputes. The strike and lockout in the building trades in this district, in which probably 10,000 men were involved, ended yesterday and all are back at work. The cause of the trouble was over the scale for hoisting engineers, and the question has been left to arbitration.

The board of directors of the Carnegie Steel Company was scheduled to meet yesterday to elect a successor to W. E. Corey, who, having been chosen president of the United States Steel Corporation, was expected to resign the presidency of the Carnegie concern. It is conceded here that A. C. Dinkey, general manager of the Homestead steel works, will be his successor. Several members of the board were unable to attend and the meeting was postponed.

Pig Iron.—While there has been no business in bessemer this week, the market appears to be in somewhat better shape and the outlook is not at all discouraging. Several thousand tons of gray forge sold during the week at prices ranging from $16 to $16.50, Pittsburg, but most of the tonnage was at the lower figure. Lots of foundry No. 2 aggregating 3,000 tons sold yesterday at $17.50@$18, Pittsburg.

Steel.—The billet market is firm, the established price of $27 being maintained. A lot of 1,000 tons of sheet bars sold yesterday at $28.50. Steel bars and plates are firm at 1.60c.

Sheets.—The sheet market is in better shape than it was a week ago. There is very little shading being done this week, the maximum being 5c. a hundred. Black sheets, No. 28 gauge, are quoted at 2.07c.@2.75c. and galvanized at 3.80c.@3.85c.

Ferro-manganese.—There is no change in the market. English ferro can be bought at $49 in large lots, and small lots are quoted at $51.50@$52.

Cartagena, Spain. July 25.

(*Special Report of Barrington & Holt.*)

Iron and Manganiferous Ores.—Shipments for the week included one cargo, 625 tons dry ore, to New York; two cargoes, 7,800 tons dry ore, to British ports; one cargo, 2,700 tons dry ore, to St. Nazaire; four cargoes, 9,310 tons manganiferous ore, to British ports. While shipments have been good, forward trade is dull.

Prices are firm at 6@7s. per ton, f. o. b. shipping port, for ordinary 50 per cent ore; 7s. 3d.@7s. 9d. for special low phosphorous; 9s. 3d. for 58 per cent specular ore. Magnetic ore, 60 per cent iron, is 11s. 6d. for lump and 9s. 6d. for smalls. Manganiferous ores range from 14s. 6d. for 20 per cent manganese and 20 iron to 9s. 9d. for 12 manganese and 35 iron.

Pyrites.—Iron pyrites 40 per cent iron and 43 per cent sulphur are quoted at 10s. 6d. per ton, f. o. b. Cartagena. No shipments reported for the week.

CHEMICALS AND MINERALS.

(See also Prices-Current, Page 262.)

New York, Aug. 12.

The market is listless, excepting that nitrate of soda has assumed renewed strength and brimstone is feverish. New contracts are few, and for certain heavy chemicals manufacturers seem unwilling to book at current low quotations.

A surprise has been sprung on the trade by the report that the Virginia-Carolina Chemical Company, the Southern fertilizer combination, is about to ask a loan of $6,000,000 to $7,000,000. Simultaneously a report has been currented that owing to overproduction the company has been obliged to close its plants at Charleston, S. C. This rumor can probably be contradicted by the fact that the company usually makes repairs at its various plants about this time. There is no doubt, however, that the company has many credit accounts on its books for periods of six to eight months which await the harvesting and marketing of crops before payments can be made. This, coupled with the expansion of the business, notably the heavy expenditures for new property, explains partly why more money is needed. Still, it is not very long ago that the company issued $7,000,000 in 5 per cent bonds. Besides, it has an authorized capital stock of $50,000,000, of which $39,984,400 has been issued. To meet the annual dividend of 8 per cent on the preferred stock and 5 per cent on the common, together with 5 per cent interest on the sinking fund bonds, a total of $2,709,220 must be disbursed. This is equivalent to nearly 84 per cent of last year's gross profits. It can be seen, therefore, how burdensome another loan would be, and which very likely would necessitate a reduction in the common dividend rate.

Attention is now directed to the approaching termination of the agreement among the German potash salt mines, under the incorporated name of the German Kali Syndicate. Re-appraisements will be made of the various properties, production allotted and a new policy inaugurated favoring the accumulation of a reserve fund for acquiring mines or shares in independent companies. Provision will also be made to satisfy losses from depression in trade. There is no doubt that the acquisition of potash mines by the Americans has had some influence in revising the business methods heretofore practiced by the syndicate.

An industry for years little heard of in this country, but now showing signs of expansion, is the manufacture of lithium salts. Just at present California is the favorite seat of activity, and lately a new concern, the American Lithia & Chemical Company, has been formed to erect a plant for producing lithium salts and other chemical compounds. In 1902 the output in the United States amounted to 1,870 tons, which shows an increase of 120 tons over 1901, owing to a larger consumption superinduced by lower prices. In addition, our imports summed up 21,216 lb., of which 5,530 lb. were carbonate, which is used in the manufacture of medicinal mineral waters and effervescing lithia tablets. Lithium carbonate sells at $1.35 per lb., f. o. b. New York, while the nitrate, which is consumed for pyrotechnics to give a red fire, is worth 60c. per oz. Roughly speaking, the annual consumption of lithium salts in this country is about 55,000 lb. The surplus is exported.

Cyanide of Potassium.—Small lots are being exported to Mexico at slightly firmer prices, but the domestic market is still quoted at 20c. per lb., f. o. b. New York. Arrivals of foreign cyanide are less frequent, but this does not necessarily mean that the domestic production is unseating British or German makes. Contrary, there is reason to believe that the foreign supply is large enough to permit of keen competition.

Bleaching Powder.—Manufacturers are thoughtful, apparently hoping for a more opportune time to open their books for next year's contracts. Momentarily Liverpool brands are quoted abroad at an equivalent of 70s. to 87c. per 100 lb., which is an average of 46 per cent less than a year ago. No wonder producers are unwilling to raze their profits further. Prime brands can be bought f. o. b. New York for early delivery at $1@$1.10 per 100 lb., while others testing less than 35 per cent. chlorine can doubtless be had at much less.

Copper Sulphate.—Business is limited at $4.62½@$4.75 per 100 lb., f. o. b. New York. Exports are even smaller than the domestic demand.

Acids.—Contract deliveries continue to absorb attention, while prices are unchanged.

We quote as below, per 100 lb., unless otherwise specified, for large lots in carboys or bulk (in tank cars), delivered in New York and vicinity:

Muriatic, 18°	$1.50	Oxalic, Com'l..	$5.00@$5.12½
Muriatic, 20°	1.00	Sulphuric, 50°, bulk, ton	13.50@14.50
Muriatic, 22°	1.75	Sulphuric, 60°	1.05
Nitric, 36°	4.37½	Sulphuric, 60°, bulk, ton	18.00@20.00
Nitric, 38°	4.75	Sulphuric, 66°	1.20
Nitric, 40°	5.00	bulk, ton	21.00@23.00
Nitric, 42°	5.37½		

Brimstone.—The market is expectant, as the new melting is on at the Sicilian mines, and some concession is looked for in the prices of dissidents. Low ocean freight rates also favor the importers. Best unmixed seconds on spot are worth about $22.50 per ton, while shipments vary from $22 to $22.25. Best thirds are quoted nominal at $1 less than seconds.

Sicilian Brimstone Market.—Messrs. Emil Fog & Sons, of Messina, write us, under date of July 31, as follows: There was a revival in exports in June, especially to the United States, whereto shipments in May had decreased, owing to offers from the Louisiana mines. We regret that the strike in the sulphur districts is expanding. All available troops at Messina and Palermo were hurried on to Caltanisetta to prevent disturbances. On June 25 the burning of the sulphur ore accumulated during the winter, which until then is prohibited in order to avoid damage to the cereal crops, has begun. New brimstone will shortly arrive, and sales from dissidents will influence the market. For some time hence, however, entries of brimstone will remain short on account of the scarcity of railway cars, occupied in preference with the transport of cereals. The Anglo-Sicilian Company, owing to the strikes and the momentary scarcity in arrivals, is slightly raising quotations, but so far has not been able to effect any important sale. Freights are still low—New York, 7s.; Boston, 7s. 6d.; Baltimore, whole steamers, 7s.; ballast lots, 7s. 6d.; Portland, 7s. 3d.; Baltic, 9s. 6d.; Gutujewski, 8s. 6d.; San Francisco lots of 25 tons minimum, via Antwerp, 7s. We quote, f. o. b.: Best unmixed seconds, bulk, 81s. 3d.; best thirds, bulk, 78s. 9d.; current thirds, bulk, 77s. 6d.; refined block sulphur, bulk, 86s. 6d.; refined block sulphur, in bags, 89s.; refined roll sulphur, in bags, 92s. 9d.; refined, in strong 3 cwt. casks, 98s.; in cases of 50 kilos, in sticks, 102s. 6d.@104s. 6d.; sublimed flowers, pure, in bags, 103s. 9d.; sublimed flowers current, bags, 97s. 6d.; sublimed flowers, commercial, bags, 92s. 3d.; best seconds ground, bags, 88s.

Pyrites.—There has been a slight falling off in deliveries to fertilizer and acid makers, but it is not thought that the year's business will show any heavy depreciation. With brimstone prices still high, pyrites will continue in demand. There is also hope that the results to be obtained by the European pulp manufacturers, who have lately changed from brimstone to pyrites burning, will be satisfactory enough to induce American mills to follow the same policy. Certainly the difference in the cost of brimstone and pyrites sulphur would favor such a change, notwithstanding the heavy expenditure for a new plant.

We quote: Domestic pyrites, $5 per ton for lump ore, f. o. b. Atlantic coast mines, and 10c. per unit for fines; sulphur content varies from 42@44 per cent. Spanish pyrites, carrying from 46@52 per cent sulphur, are quoted at 11@12c. per unit for lump and 10@10½c. for fines delivered at Atlantic ports.

Nitrate of Soda.—The market continues to strengthen. Spot is quoted at $2.15 per 100 lb., and futures $2.02½. The favorable statistical position explains this.

Chilean Nitrate of Soda Market.—Messrs. Jackson Bros., of Valparaiso, write us under date of June 13 as follows: A fair demand sprang up during the fortnight, especially for shipment during the months of August to November. Transactions in 95 per cent. have taken place at 6s. 4¾d. for prompt, 6s. 5½d. July, 6s. 6½@6s. 7d. August-November, and in refined at 6s. 7d. for prompt, 6s. 8½d. August-December and at 6s. 8d. for January-March deliveries, all alongside terms. The production for May has not been advised from Iquique, but the consumption of the world is cabled as 2,996,700 qtls., making the total for the five months 20,190,700 qtls., against 16,802,000 qtls. in the same period last year, showing an increase of 3,388,700 qtls. We quote: 95 per cent., June-July, 6s. 5d.; August-December, 6s. 7d., and 96 per cent., June-July, 6s. 8d.; August-December, 6s. 8½d., all ordinary terms sellers. The price of 6s. 5½d., with an all-round freight of 20s., stands in 8s. 2¼d. per cwt., net cost and freight, without purchasing commission. Reported sales are 591,000 qtls., and resales 88,000 qtls.

Sulphate of Ammonia.—The weakness in the foreign market is beginning to manifest itself in New York, and prices for good gas liquor are now $3.02½@$3.05 per 100 lb. for shipments. Practically nothing is doing on spot.

Phosphates.—Quiet. In the foreign market some sellers of high-grade Florida rock ask 6⅝@6¾d. per unit ($10.34@$10.53 per ton), c. i. f. United Kingdom ports, but for the Continent ½d. more is quoted. For South Carolina and the lower grade of Algerian 4⅝@4¾d. is asked c. i. f. United Kingdom ports, with a fractional advance for Continental countries.

Shipments of Peace River pebble phosphates in July amounted to 10,680 tons, making 39,695 tons for

Phosphates.	Per ton. F. o. b.	United Kingdom or European ports. Unit.	Long ton.
*Fla. hard rock (77@80%).	$7.00@$7.50	6⅝@7½d.	$10.34@11.70
*Fla. land peb. (68@73%).	3.50@ 3.75	5½@5⅝d.	7.70@ 8.05
†Tenn. (78@82%) export..	4.00@ 4.25	6½@7d.	10.40@ 8.05
†Tenn. 78% domestic.....	3.75@ 4.00	.....	.....
†Tenn., 75% domestic.....	3.50	.....	.....
†Tenn., 73@74% domestic.	2.95@ 3.20	.....	.....
†Tenn., 70@72% domestic.	2.70@ 2.95	.....	.....
‡So. Car. land rock.....	...@ 3.25	.....	.....
‡So. Car. riv. r'k (55@60%)	2.75@ 3.00	4⅝@5½d.	5.55@ 6.60
Algerian (63@70%).....	.....	5½@6¼d.	7.37@ 8.38
Algerian (58@63%).....	.....	4⅝@5¾d.	5.55@ 6.90
Gafsa (Tunis)	.....	5¼@6d.	6.30@ 7.20
Christmas Isl. (80@85%)..	.....	7¼@7⅝d.	12.04@12.87

*Fernandina, Tampa, Brunswick, Savannah or Port Inglis. †Mt. Pleasant. ‡On vessels, Ashley River.

Liverpool. July 29.

(Special Report of Joseph P. Brunner & Co.)

The market for heavy chemicals is quietly steady without much doing.

Soda Ash.—For tierces the nearest values is about as follows: Leblanc ash, 48 per cent., £5 10s.@£5 15s.; 58 per cent, £6@£6 10s. per ton. Ammonia ash, 48 per cent, £4 5s.@£4 10s.; 58 per cent, £4 15s. per ton for tierces; usual extras for smaller sized packages, or an allowance of 5s. per ton for single bags.

Soda Crystals.—Price unchanged at generally £3 7s. 6d. per ton, less 5 per cent for delivery in barrels, 7s. per ton less in 2 cwt. bags; special terms for a few favored markets.

Caustic Soda.—Quotations are unchanged as follows: 60 per cent, £8 15s.; 70 per cent, £9 15s.; 76@77 per cent, £10 10s. per ton, net in usual drums of 5@7 cwts., with extras for smaller sized packages.

Bleaching Powder.—More inquiries are being made for prompt and next year's delivery. Makers are not anxious to sell ahead over next year. For delivery from now to the end of the year the price is about £3 10s. per ton in hardwood packages, but only a very limited quantity can be bought at this price.

Chlorate of Potash is quoted at 2¾d.@3d. per lb. net cash for English make.

Bicarbonate of Soda is unchanged at generally £6 15s. per ton in 1 cwt. kegs for the Crescent brand best quality; inferior makes are slightly cheaper, and for aerated water manufacture the price for this special quality is 30s. per ton, less than that for the best quality.

Sulphate of Ammonia is very quiet on the spot, good gray being quoted £12 11s. 3d.@£12 12s. 6d. per ton, less 2½ per cent free on board here in double bags.

Nitrate of Soda.—The market is very firm at £10 per ton, less 2½ per ton for double bags, f. o. b. here.

METAL MARKET.

New York, Aug. 13.

Gold and Silver Exports and Imports,

At all United States Ports in June and Year.

Metal	June. 1902.	June. 1903.	Year. 1902.	Year. 1903.
Gold:				
Exports.....	$391,525	$12,507,588	$20,276,237	$31,327,483
Imports.....	4,086,457	4,767,553	13,187,344	15,368,199
Excess	E. $3,694,932	E. $7,740,035	E. $7,088,893	E. 15,959,284
Silver:				
Exports.....	$3,250,066	$1,551,410	$22,528,034	$17,426,973
Imports.....	1,802,853	2,050,805	12,220,738	10,340,798
Excess	E. $1,447,213	E. $499,395	E. $10,307,296	$7,086,175

These exports and imports cover the totals from all United States ports. The figures are furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York.

For the week ending August 12, and for the years from January 1:

Period.	Gold. Exports.	Gold. Imports.	Silver. Exports.	Silver. Imports.	Total Excess, Exports or Imports.
Week..	$1,200	$14,883	$343,656	$29,401	E. $45,484
1903....	2,162,749	3,628,222	12,584,348	1,283,695	E. 9,875,120
1902....	24,004,088	1,521,145	15,739,324	807,944	E. 37,414,303
1901....	25,733,318	1,819,822	20,029,804	2,466,202	E. 41,557,128

Gold exports were small; imports were chiefly from the West Indies, silver exports were to London; imports were from Central and South America.

The stock markets continue weak and irregular. General business is in fair condition, though there is a certain tendency to hold back and wait until the speculative situation clears a little. In other words, there is some uncertainty about the future, which is beginning to be felt in trade. The volume of business continues to be large, however, and there is no apparent reason for doubting the future as yet.

The statement of the New York banks, including the 56 banks represented in the Clearing House, for the week ending August 8, gives the following totals, comparisons being made with the corresponding weeks of 1902 and 1901:

	1901.	1902.	1903.
Loans and discounts....	$886,455,600	$926,494,800	$912,697,100
Deposits	965,381,000	959,643,000	912,272,500
Circulation	30,553,200	31,880,200	43,916,900
Specie	183,095,500	171,468,400	171,841,900
Legal tenders	79,202,700	77,473,600	77,813,300
Total reserve	$262,298,200	$248,942,000	$250,655,200
Legal requirements	241,345,350	239,910,750	248,174,200
Balance surplus	$20,952,950	$9,031,250	$11,481,006

Changes for the week were increases of $3,932,600—in loans and discounts $2,414,800, $1,103,600 in specie, and $54,300 in circulation; decrease of $2,972,900 in legal tenders and $2,473,000 in surplus reserve.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparisons made with the holdings at the corresponding date last year:

	1902. Gold.	1902. Silver.	1903. Gold.	1903. Silver.
N. Y. Ass'd..	$171,468,400	.....	$171,841,900	.....
England	182,890,530	.....	175,123,430	.....
France	523,316,695	$224,867,705	511,495,820	$225,249,650
Germany	186,345,000	68,925,000	171,380,000	60,215,000
Spain	71,015,000	97,925,000	73,000,000	102,300,000
Netherlands...	24,250,000	33,378,500	19,700,500	32,433,500
Belgium	15,433,335	7,716,665	14,540,000	7,270,000
Italy	80,725,000	10,138,000	94,940,000	11,576,000
Russia	373,465,000	45,000,000	406,720,000	44,890,000
Austria Hung	220,725,000	63,430,000	226,640,000	64,975,000

The returns of the Associated Banks of New York are of date August 8, and the others August 6, as reported by the *Commercial and Financial Chronicle* cable. The New York banks do not report silver separately, but specie carried is chiefly gold. The Bank of England reports gold only.

The silver market has remained steady this week, with small fluctuations. Forward delivery is in much better demand, with bid price closer to spot quotation than for several months.

The Treasury Department last week bought 55,000 oz. silver for Philippine coinage, the average price being 55.2c. per ounce. On August 11 an additional quantity of 70,000 oz. was bought, at 55.25c., delivered at the San Francisco mint.

The United States Assay Office in New York reports receipts of 32,000 oz. silver for the week.

Shipments of silver from London to the East for the year up to July 30 are reported by Messrs. Pixley & Abell's circular as follows:

	1902.	1903.	Changes.
China	112,380	247,499	I. 135,719
The Straits.....	70,550	548,679	I. 478,129
Total	£3,942,975	£4,374,703	I. £431,728

Receipts for the week were £76,000 in bar silver from New York, and £2,000 from Australia; total, £78,000. Shipments were £30,000 in bar silver to Bombay, £45,000 to Colombo, £10,000 to Singapore, £5,000 to Madras, and £5,000 to Calcutta: total, £95,000.

Indian exchange has been somewhat firmer, owing to a strong demand for money in India, and also to some purchases of bills on Chinese account. The Council bills offered in London were all taken at an average price of 16.0⅜d. per rupee. Buying of silver for India continues on a fair scale, but remittances in that form do not seem to have affected the demand for bills.

Prices of Foreign Coins.

	Bid.	Asked.
Mexican dollars.....	$0.43	$0.45
Peruvian soles and Chinese pesos.....	.39	.44
Victoria sovereigns.....	4.86	4.88
Twenty francs.....	3.86	4.88
Spanish 25 pesetas.....	4.78	4.82

OTHER METALS.

Daily Prices of Metals in New York.

August.	Sterling Exchange.	—Silver— N. Y. Cts.	—Silver— London Pence.	—Copper— Lake, Cts. per lb.	—Copper— Electrolytic, Cts. per lb.	—Copper— London, £ per ton.	—Copper— Tin, Cts. per lb.	—Spelter— Lead, Cts. per lb.	—Spelter— N. Y., Cts. per lb.	—Spelter— St. Louis, Cts. per lb.
6	4.85⅝	54⅞	25⅝	12¾ @13	12⅛ @12¾	56¾	28⅛	4.05 @4.10	5.67½	5.50
7	4.85⅝	54⅞	25⅝	12¾ @13	12⅛ @12¾	57⅛	29	4.05 @4.10	5.67½	5.50
8	4.85⅜	55	25 1/16	12¾ @13	12⅛ @12¾	....	29	4.05 @4.10	5.67½	5.50
10	4.85⅛	54⅞	25⅜	12¾ @13	12⅛ @12¾	57	29	4.05 @4.10	5.72½	5.55
11	4.85⅜	54¾	25 1/16	12¾ @13	12⅛ @12¾	57¾	28⅛	4.05 @4.10	5.72½	5.55
12	4.85⅛	54¾	25 1/16	12¾ @13	12⅛ @12¾	58	28⅛ @ 28¾	4.05 @4.10	5.72½	5.55

London quotations are per long ton (2,240 lbs.) standard copper, which is now the equivalent of the former g. m. b's. The New York quotations for electrolytic copper are for cakes, ingots or wirebars: the price of electrolytic cathodes is usually 0.25c. lower than these figures.

Copper.—During the week under review, the flat tendency of the Stock Exchange has put a check on the improvement which we were able to report last week, and it is only at the close that a somewhat better sentiment developed. A moderate business has been done, both for home trade and for export, but again at some slight concessions in prices. The closing quotations are given as 12¾@13c. for Lake; 12½@12¾c. for electrolytic copper in ingots, cakes and wirebars, 12¼@12½c. in cathodes; 12¼@12⅜c. for casting copper.

The market for standard copper in London, which closed last week at £57 2s 6d., opened on Monday at £57, and the closing quotations on Wednesday are cabled as £58@£58 1s. 3d. for spot, £56@£56 1s. 3d. for three months.

Refined and manufactured sorts we quote: English tough, £60@£60 10s.; best selected, £61@£61 10s.; strong sheets, £69 10s.@£70; India sheets, £66 10s.@£67; yellow metal, 6¼@6⅜d.

Exports and imports of copper at New York, Philadelphia and Baltimore in the week of August 11 and for the year to date were, in long tons:

Exports—	Week.	Year.
Austria	115	3,412
Belgium	40	937
France	...	11,998
Germany	1,333	15,864
Holland	1,116	23,103
Italy	189	1,751
United Kingdom.....	367	9,794
Other countries	110	3,700
Total copper	3,270	70,559
Matte	...	286
Imports—		
Copper	239	16,111
Matte	...	984
Ore	...	20,840

Exports show an increase; but imports have fallen off.

Tin has been fairly active throughout the week, spot metal remaining rather scarce and commanding a premium. At the close we quote early delivery at 28½@28¾c.; August, 28@28¼c.; September, 27½@27¾c.

The foreign market, which closed last week at £130, opened on Monday at £128 10s., declined on Tuesday to £127, and the closing quotations on Wednesday are cabled as £128@£128 2s. 6d. for spot, £124@£124 2s. 6d. for three months.

Lead is in fair demand, and the ruling quotations are 4@4.02½c. St. Louis, 4.05@4.10c. New York.

The foreign market is somewhat better, Spanish lead being quoted at £11@£11 1s. 3d. English lead, £11 2s. 6d.@£11 3s. 9d.

Spanish Lead Market.—Messrs. Barrington & Holt report from Cartagena, Spain, under date of July 25, that the price of silver during the week has been 13.50 reales per ounce. The local quotation for pig lead on wharf has been 63.75 reales per quintal. Exchange has gone up 8 centimes, making it 34.54 pesetas to £1. The price on this exchange is equal to £10 6s. 7d. per ton of 2,240 lb., f. o. b. Cartagena. Exports have been 63,000 gk. soft lead to Marseilles.

Spelter is in good demand and has developed considerable strength. Early deliveries are rather scarce and commanding a premium. The closing quotations are given as 5.52½@5.57½c., St. Louis: 5.70@5.75c., New York.

The foreign market is steady, good ordinaries being quoted at £20 5s.; specials, £20 10s.

Spanish Zinc Ore Market.—Messrs. Barrington & Holt write from Cartagena, Spain, under date of July 25, that nothing has been done in ores, buyers and sellers both holding firm. Shipments were 3,300 tons blende to Antwerp.

Antimony is dull and depressed. We quote Cookson's at 7@7½c.; Hallett's, 6⅞c.; Hungarian, Japanese, U. S., French and Italian at 6⅛c.

Nickel.—The price is quoted by leading producers at 40@47c. per lb. for large quantities down to ton lots, according to size and terms of order. The price for smaller lots, according to quantity, runs as high as 60c. per lb.

Platinum.—Consumption continues good, and prices are firm. Ingot platinum in large lots brings $19 per oz. in New York.

Quicksilver.—The New York price is unchanged at $47.50 per flask for large lots, with a slightly higher figure quoted for small orders. The San Francisco quotations are still $44.50@$46 per flask for domestic orders and $42@$43 for export. The London price is £8 12s. per flask, with the same quotation asked by second hands.

Minor Metals and Alloys.—Wholesale prices, f. o. b. works, are as follows:

Aluminum.	Per lb.		Per lb.
No. 1 99% ingots	33@37c.	Ferro-Tungsten (37%)	28c.
No. 2 90% ingots	31@34c.	Magnesium, pure (N.Y.)	60c.
Rolled Sheets	4c. up	Magnesium	$2.75
Alum-bronze	20@23c.	Mangan'e Cop. (20% Mn)	32c.
Nickel-alum	33@39c.	Mangan'e Cop (30% Mn)	38c.
Bismuth	$2.10	Molybdenum (Best)	$1.82
Chromium, pure (N.Y.)	80c.	Phosphorus, foreign	45c.
Copper, red oxide	50c.	Phosphorus, American	70c.
Ferro-Molybdu'm (50%)	$1.25	Sodium metal	50c.
Ferro-Titanium (10%)	90c.	Tungsten (Best)	62c.
Ferro-Titanium (20@25% N. Y.)	55c.		

Variation in prices depends on size of orders, deliveries, etc.

Missouri Zinc Ore Market. Aug. 8.

(From Our Special Correspondent.)

One bin of zinc ore, sold ten days ago at $41.50 per ton, was shipped out this week. It was from the H., P. & P. Mine, on the land of the Continental Zinc Company, in the west edge of Joplin. The peculiar purity of this ore caused a particular competition for it, by which the price was advanced. This was the highest price paid, and was $1.50 per ton higher than any other ore was sold. Buyers continue to vary the assay basis price from $35 to $37 per ton of 60 per cent zinc where any attention is paid to the assay basis at all.

Lead maintains the advance of a week ago, although, according to the St. Louis metal market quotations, the price is such as to leave only a small margin for smelting. At the present price of $54 per ton there is left as a smelting charge, on the old basis of arriving at the value of the ore contents, $3.50 per ton, or just one-half the amount customary to charge when this mineral was formerly purchased on a basis of 70 per cent metallic content based on the market in St. Louis.

The following are the shipments of zinc and lead ores from the Joplin district for the week ending today:

	Zinc ore, lbs.	Lead ore, lbs.	Value.
Joplin	2,504,310	285,650	$52,045
Webb City-Carterville	1,722,840	409,670	41,210
Galena-Empire	1,055,360	58,100	20,620
Duenweg	736,720	57,340	15,140
Aurora	654,210	13,790	10,450
Oronogo	443,970	8,240	7,930
Alba-Neck	402,840	11,220	7,745
Zincite	398,000	.....	7,465
Carthage	269,740	46,220	6,350
Prosperity	191,850	27,440	4,290
Mitchell	191,550	6,650	3,575
Granby	234,000	24,500	2,860
Carl Junction	142,970	.....	2,465
Cave Springs	83,590	16,090	1,930
Central City	49,540	1,430	860
Totals	9,081,490	966,340	$185,165
Thirty-two weeks	301,823,770	35,876,480	$6,137,670

Zinc value, the week, $159,110; thirty-two weeks, $5,169,395.
Lead value, the week, $26,055; thirty-two weeks, $968,275.

A week ago to-day the railroads placed an embargo on ore shipments to Iola, Le Harpe and Gas City, in the Kansas gas belt. As this affected four smelters, making it practically impossible for them to ship from Joplin, the rescinding order received on Thursday was welcome news, not only to these smelters, but to the shippers as well. The restriction was placed because of the tie-up of unloaded freight cars at Gas City, and this was occasioned by a shortage of labor, many of the laborers and some smeltermen leaving their work and going into the harvest field, where a premium was being paid for labor. It is reported here that several furnaces are still shut down from a lack of employees who understand the work. The car embargo lowered the shipments one car of zinc below last week, yet compared to the same week of last year, the shipments is a decrease of 1,236 tons, or 41 cars. The lead shipments were 210 tons less than last week and 180 tons less than a year ago, when lead sold at $49 and zinc at $38 per ton. With this week, the district total value passes $6,000,000, having reached that figure two weeks ahead of last year.

LATE NEWS.

Received too late for insertion in usual place.

London. Aug. 3.

(From Our Special Correspondent.)

Some two months ago a series of articles was commenced in the columns of a London financial daily entitled "The Alaska of the Future." They have since made their appearance from time to time, and the gradual evolution of their character from plain, innocent journalism to forward notices, emanating from a promoter, has been very interesting to watch. The articles appeared at intervals of a week or a fortnight, so as to disarm suspicion as to their real character. Their authorship was not disclosed, and at first they apparently emanated from some disinterested technical correspondent. As the series proceeded it became obvious that a flotation in London of a Silver Bow Basin property was the ultimate goal, and finally the mine owned by the Alaska Perseverance Mining Company became the chief theme of the writer. A very full and rosy account was given of the mine and its prospects, and the scheme for development and equipment is described in detail. The series of articles has concluded without any publication of the author's name or any statement as to his interest in the property. I can enlighten your readers on the subject. They came from the pen of Colonel W. J. Sutherland, who is bent on introducing the property in this country. Judging by his previous operations in connection with raising money here for various schemes, there will be no public issue, but the business will be transacted privately from the neighborhood of Park Lane. As far as the property is concerned, some of your readers may be able to give unbiased accounts of its value. According to Colonel Sutherland's statements, the property is an old one, and has changed hands several times. There is a great amount of ore exposed, averaging about $5, and operations can only be conducted at a profit by working on a large scale. The proposition is to erect 300 stamps to treat 1,500 tons a day; and it is presumably for the purpose of obtaining some of the funds necessary for this equipment that Colonel Sutherland has come over here. As I have already said, I have no independent testimony as to the value of the property, so I am unable to pass any judgment on the present scheme. All I can say is that I hope it will bring more profit to the investors than some previous propositions have.

The supply of wild-cat mining schemes from America is very liberal at present. The latest corner is the Bingham Copper Boy Mining Company, a company formed under the laws of the State of Utah, to acquire the Copper Boy and other claims on Highland Boy Peak. These claims appear to be a few useless ones lying by the side of the Utah Consolidated and the Boston Consolidated. The prospectus says nothing about their value, but quotes the performances of the other companies. The shares are being peddled here by an English corporation called the Foreign Syndicate, Limited, whose business is entirely confined to the introduction of wild-cats here. I have several times mentioned this syndicate, more especially in connection with a company they introduced owning claims adjoining the great Arizona copper producers. Instead of quoting the successes of other great copper companies, the Foreign Syndicate ought to draw attention to the unsuccess of every company fathered by it or taken under its wing.

After chronicling the doings of such companies as this, it is a pleasure to turn to the report of the Camp Bird for the first year of its English ownership. As you will be quoting the report in full in another part of your issue, it is not necessary to go into details here. The market for the shares of this company is a very curious one. Ordinarily the possession of reserves, the treatment of which should yield a profit greater than the capital of the company, makes the shares of the company much sought after, and they usually stand at a high premium. In the present case the £1 shares stand at about 25s., though they have been over 30s. At this price they are decidedly worth acquiring, but there is no desperate desire on the part of the public to rush in. Though it is unpleasant to have to say so, yet it is none the less true that the doings of the board are eyed askance. The fear is that the true condition of the mine is not disclosed, and that there are all sorts of schemings behind the scenes. The public are quite justified in suspecting that, when there are two mines with the same control, what happens in connection with the management of one of them may happen with the other; so it is only to be expected that Camp Bird is not popular. This is the reason why the quotation is so low. We have the evidence of Mr. Curle that the mine is really a great one, so that these suspicions ought to be dispersed.

The continued fall in the prices of shares in the South African market is causing great anxiety in some quarters of the city and among the speculators who bought during the war for a rise when peace was declared.

Average Prices of Metals per lb., New York.

Month.	Tin. 1903.	Tin. 1902.	Lead. 1903.	Lead. 1902.	Spelter. 1903.	Spelter. 1902.
January	28.33	23.54	4.075	4.000	4.865	4.27
February	29.43	24.07	4.075	4.075	5.043	4.15
March	30.15	26.32	4.442	4.075	5.349	4.28
April	29.81	27.77	4.567	4.075	5.550	4.37
May	29.51	29.85	4.325	4.075	5.639	4.47
June	28.34	29.36	4.210	4.075	5.697	4.96
July	27.68	28.38	4.075	4.075	5.662	5.27
August	....	28.23	....	4.075	....	5.44
September	....	26.60	....	4.075	....	5.49
October	....	26.07	....	4.075	....	5.38
November	....	25.68	....	4.075	....	5.18
December	....	25.68	....	4.075	....	4.78
Year	....	26.79	....	4.069	....	4.84

Note.—The average price of spelter in St. Louis for the month of January, 1903, was 4.689c. per lb.; for February, 4.861c.; for March, 5.174c.; for April, 5.375c.; for May, 5,469c.; for June, 5.537c.; for July, 5.507c.

Average Prices of Copper.

Month.	New York. Electrolytic. 1903.	Electrolytic. 1902.	Lake. 1903.	Lake. 1902.	London. Standard. 1903.	Standard. 1902.
January	12.159	11.053	12.361	11.322	53.52	48.43
February	12.778	12.173	12.901	12.378	57.34	55.16
March	14.416	11.882	14.572	12.188	63.85	53.39
April	14.454	11.618	14.642	11.986	61.72	52.79
May	14.435	11.856	14.618	12.226	61.73	54.03
June	13.942	12.110	14.212	12.360	57.30	53.93
July	13.094	11.771	13.341	11.923	56.64	52.89
August	.....	11.404	.....	11.649	....	51.96
September	.....	11.480	.....	11.700	....	52.68
October	.....	11.449	.....	11.722	....	52.18
November	.....	11.288	.....	11.533	....	51.08
December	.....	11.430	.....	11.599	....	50.95
Year	.....	11.628	.....	11.887	....	52.46

New York prices are in cents, per pound; London prices in pounds sterling, per long ton of 2,240 lbs., standard copper. The prices for electrolytic copper are for cakes, ingots or wire bars; prices of cathodes are usually 0.25 cent lower.

Average Prices of Silver, per ounce Troy.

Month.	1903. London, Pence.	1903. N. Y. Cents.	1902. London, Pence.	1902. N. Y. Cents.	1901. London, Pence.	1901. N. Y. Cents.
January	21.98	45.57	25.62	55.56	28.97	62.82
February	22.11	47.89	25.41	55.09	28.13	61.06
March	22.49	48.72	25.00	54.23	27.04	60.23
April	23.38	50.56	24.34	52.72	27.30	59.29
May	24.89	54.11	23.71	51.31	27.43	59.64
June	24.29	52.86	24.17	52.36	27.42	59.57
July	24.86	53.92	24.38	52.88	26.96	58.46
August	....	....	24.23	52.52	26.94	58.37
September	....	....	23.88	51.52	26.95	58.26
October	....	....	23.40	50.57	26.62	57.59
November	....	....	22.70	49.07	26.12	56.64
December	....	....	22.21	48.03	25.46	55.10
Year	....	....	24.09	52.16	27.11	58.95

The New York prices are per fine ounce; the London quotation is per standard ounce, .925 fine.

ASSESSMENTS.

Name of Company.	Location.	No.	Delinq.	Sale.	Amt.
Andes	Nev.	59	Aug. 11	Sept. 13	.10
Belle Josephine	Cal.	..	Aug. 20	.....	.60
Con. Cal. & Va	Nev.	..	Aug. 28	Sept. 18	.25
Exchequer	Nev.	42	Aug. 15	Sept. 3	.03
Galena	Utah	8	Aug. 12	Aug. 29	.05
Hale & Norcross	Nev.	..	Aug. 31	Sept. 30	.10
Highland	Utah	9	Aug. 10	Sept. 1	.01
Jenny Lind	Cal.	..	Aug. 21	.....	.01½
La Querte	Cal.	..	Aug. 26	.....	.02½
Manhattan	Utah	6	Aug. 20	Sept. 10	.00¾
Mayday	Utah	..	Aug. 15	Sept. 3	.02
Overman	Nev.	..	Aug. 19	Sept. 10	.10
Savage	Nev.	..	Aug. 25	Sept. 15	0.10
Seg. Belcher & Midas	Nev.	32	July 29	Aug. 18	.05
South Swansea	Utah	2	Aug. 7	Aug. 25	0.02
Spider	Utah	..	Aug. 12	Sept. 1	.00¾

DIVIDENDS.

Name of Company.	Date.	Per Share.	Total.	Total to Date.
Alaska-Mexican	Aug. 31	0.50	$760,440	$21,964,980
Ariz. Copper, def	Aug. 15	1.32	83,744	.....
Ariz. Copper, pf	Aug. 15	1.32	417,820	.....
*Barreno, Mex.	Aug. 15	.85	2,040	67,954
†Cambria Steel, Pa	Aug. 15	1.50	675,000	6,450,000
Camp Bird, Colo	Sept. 1	.18	147,600	820,104
*Four Oil, Cal.	Aug. 10	.01	2,087	41,740
†General Chem., common.	Sept. 1	1.25	92,629	1,207,908
*Homestake, S. Dak.	Aug. 25	.25	54,600	12,148,950
Iron Silver, Colo.	Aug. 1	.10	50,000	2,800,000
§Jeff. & Clearf. C. & I., pf.	Aug. 14	2.50	37,500	540,500
Jeff. & Clearf., common	Aug. 14	5.00	75,000	180,000
*Kendall, Mont.	Aug. 22	.04	20,000	155,000
*Los Dos Estrellas, Mex.	Aug. 15	12.75	38,250	446,400
*Mines Co. of Am.	Aug. 20	.01½	25,000	230,000
*Natwidad, Mex.	Aug. 25	4.25	10,200	224,466
§Phila. Nat. Gas., pf.	Sept. 1	1.25	99,950	1,009,067
Stratton's Independence	.....	.25	265,002	3,930,273
*San Rafael, Aviador, Mex.	Aug. 15	8.50	10,200	.....
*San Rafael, Aviada, Mex.	Aug. 15	5.10	6,120	.....
Sorpressa, Mex.	Aug. 15	2.13	2,040	191,546
*Soledad, Mex.	Aug. 15	2.13	2,040	243,568
†U. S. Steel, com.	Sept. 9	1.00	5,083,025	50,809,577

¾Monthly. †Quarterly. §Semi-annual.

STOCK QUOTATIONS

NEW YORK.

Company and Location.	Par val	Shares Listed.	Aug. 5 H.	Aug. 5 L.	Aug. 6 H.	Aug. 6 L.	Aug. 7 H.	Aug. 7 L.	Aug. 8 H.	Aug. 8 L.	Aug. 10 H.	Aug. 10 L.	Aug. 11 H.	Aug. 11 L.	Sales.
Acacia, Colo.	1	1,433,000					.07								1,000
Amalgamated c., Mont	100	1,538,879	38⅛	37	40	37	40⅜	38⅝	39	37⅜	39½	37⅝	40½	39¼	128,057
Anaconda c., Mont.	15	1,200,000	70	69⅝	68⅞	66	69⅛	68½	67⅝	67	98¼	66¼	98½		5,630
Anaconda Gold, Colo.	5	1,000,000									10				500
Best & Belcher, Nev.	3	100,000									1.95				100
Challar, Nev.	100	112,000											.20		500
Chrysolite, Colo.	50	200,000											.01		200
Con. Cal. & Va., g.s., Nev	2½	216,000							1.40		1.45		1.40	1.35	900
*Confidence, Nev.	3	24,960											1.30		100
Cons. Imperial, Colo.	1	500,000													
Cripple Creek, c., Colo	1	2,000,000													
Elkton, g., Colo.	1	1,250,000							.47	.46	.46		.46		1,100
Gold Dollar, Colo.	1								.04¼						1,000
Golden Fleece, Colo.	1	600,000					.03½								500
Greene Con., c., Mex.	10	720,000	17⅛	16⅜	17¾	17	17¾	16¾	17	16⅝	16⅜	15¼	16½	16⅜	10,290
Gould & Curry, Nev.	1														
Hale & Norcross, Nev	3														
Horn Silver, Utah.	25	400,000							1.10						150
Iron Silver, Colo.	20														
Isabella, g., Colo.	1	2,500,000					.10				1.70				100
Kerr & Pembroke, Ont	10										10				800
Lacrosse, Colo.	10												.03		300
Leadville, Colo.	10										.03				500
Little Chief, Colo.	1														
Mexican, Nev.	3	100,800					1.30								100
Mollie Gibson, Colo.	5	1,000,000											.06		1,000
Moon-Anchor, Colo.	5	600,000									.08½				1,000
Occidental, Nev.	3	1,000,000													
Ophir, Nev.	1	100,800					1.75				1.70		1.65		500
Pharmacist, Colo.	1	1,500,000							.02½		.03				2,000
Portland, Colo.	10	3,000,000											1.13		100
Potosi, Nev.	3	112,000					.21		.22	.21			.19		1,000
Savage, Nev.	2½	112,000					.22								200
Sierra Nevada, Nev.	3	100,000													
Silver Hill, Nev	1	180,000							.72						300
Standard, Cal.	10														
Syndicate, Cal.	1	100,000											.05		1.000
Tenn., c., Tenn.	25	175,000			.26		.27		.27		.28½	.28			750
Union Con., Nev.	2½	10 ,000													
Union Cop., N. C.	10	300,000	⅝		⅝	¾	⅝	¾	⅝		1	¾			3,025
Uni'd Cop. com., Mont	100	450,000	16⅜	15¼	16⅛		16⅜		16¼		16⅜		16¾		625
Vindicator, Colo.	1	1,100,000					.75								500
White Knob, g. s., Ind.	100	150,000							9				9		45
Work, Colo.	1								.05						100
Yellow Jacket, Nev.	3	120,000													

Total sales 164,032 shares. † Ex-Dividend

BOSTON, MASS.*

Name of Company.	Par val	Shares listed	Aug. 5 H.	Aug. 5 L.	Aug. 6 H.	Aug. 6 L.	Aug. 7 H.	Aug. 7 L.	Aug. 8 H.	Aug. 8 L.	Aug. 10 H.	Aug. 10 L.	Aug. 11 H.	Aug. 11 L.	Sales.
Adventure Con., c.	$25	100,000	5⅝	5⅛	5⅞	5¼			5¾	5½	5¼		5		517
Allouez.	25	99,511	5	4½	5	4⅞	5								1,442
Amalgamated, c.	100	1,538,879	38⅛	37	40	37	40¾	38¾	39	37⅝	39½	37⅝	40¾	39⅜	27,864
Am. Gold Dredging.	5	90,000					1		1		1		1		1.650
Am. Z. L. & Sm.	25	60,000													
Anaconda	25	1,200,000													
Arcadian, c.	25	150,000	2				2		1⅛	1¼			2		700
Arnold	25	60,000													
Atlantic, c.	25	100,000			8½				8½		8¼		8½		255
Bingham Con., g. s.	50	150,000	22		22	21¼	22		22						810
Bonanza.	10	300,000	.50		.50										300
British Columbia.	5	256,500													
Cal. & Hecla, c.	25	100,000	425		425	420	420				425	420	425		122
Centennial, c.	25	90,000	14¾	14¼	15¼	14	15½	14¾	15		14½	14½	15½	15¼	2,995
Central Oil.	25	60,000									3¾	8			100
Con. Mercur, g.	5	1,000,000	1⅛		1⅛	1½	1⅛	1⅛	1⅛	1⅛	1⅛	1½	1½		1,610
Copper Range Con.	100	285,000	41¼	40	42	40	42½	41¼	41¼	40¼	40¾	39⅜	41½	40½	13,291
†Daly-West.	20	180,000	39	39½	39	38½	39		38¾		38¾	38	39		664
Dominion Coal.	100	150,000	87½	82¼	95	77	85½	81¼	82½	81	84	82½	84		7,185
Dominion Coal, pf.	100	30,000					112½	112	112		110		110	10⅜	115
Dominion I. & S.	100	100,000	10½	9¾	9¾	8½	10	9	9	8	9	8¾	9½	9	2,605
Elm River.	12	100,000	2¾		2¾				3		2¾				305
Franklin, c.	25	100,000	8		8¼	8½					8½	8¼	8¼		272
Granby Con.	10	1,336,303	3¾						3¾						500
Guanajuato Con.	5	385,000					1				1		1		795
Isle Royal Con., c.	25	385,000			6¼								7	6½	352
Mass Con., C.	25	100,000	5		5½	4¾	4¾				5½				430
Mayflower, c.	25	100,000											1		200
†Michigan, c.	25	100,000				6½					r.				100
Mohawk, c.	25	100,000	35	34½	36	34			35½	31½	35½	34¼	36	35¼	2,649
Mont. Coal & Coke.	25	200,000	3½										4		150
Mont'l & Boston, c.	5	570,000			.75	.70									800
New Idria.	5	100,000													
Nova Scotia St. & C.	100	37,623			86	81½	86				85				120
Nova Scotia St.&C., pf.	100	16,300													
Old Colony, c.	25	100,000									1			8	200
Old Dominion, c.	25	150,000			10¾	10½	12	11¼			11½	11	11¾	11⅜	2,085
Osceola, c.	25	96,150	50½	50	50		51	50½	50½	50	50¼	49½	50		898
Parrott, s. c.	10	229,850	18		17½	17	18⅛	18	18	18	18	17	19	18	763
Phœnix Con, c.	25	100,000			3¾						3¾	3½			600
Quincy, c.	25	100,000	90	85	85		90				90		90		123
Rhode Island, c.	25	100,000			1½										100
Santa Fe, g. c.	10	250,000					1¼				1				75
Shannon, c.	10	188,153	9⅝		9½	9⅜	9¼	9¼					9⅝	9¼	1,185
Tamarack, c.	25	60,000	75		75								84	80	274
Tecumseh.	25	80,000													
Tennessee.	25	160,000													
Trimountain.	100	450,000	81½	80	80		80		78						961
Trinity, c.	25	419,000	5	4⅝	5¼	4⅞	5		5	4⅝	5	4¾	5¼	4⅝	1,388
United c.	25	240,000	15⅛												25
United States, g.	10	300,000	17⅛	16¾	17⅛	17¼	17⅜	17	17¼	16⅞	17⅛	17	18	17⅝	7,861
U. S. Coal & Oil.	25	100,000	9⅞		9⅞	9½	10½	9⅞	10	9⅞	10	9¾	10		2,375
Utah Con., g.	25	100,000	24½	23½	24½	23	24¾	24	24¼	23½	24½	23⅜	24½	24	6,401
†Victoria.	25	60,000	4		3⅞	3¾			4						345
Winona, c.	25	100,000	7	6½	7¼	8	7¼	7	6¾		6¾	6½	7	6⅝	805
Wolverine, c.	25	60,000	63¼	63	63	62	63		63½		63		63		640
Wyandot.	25	100,000			1¼	1⅛					1¼				300

*Boston Stock Exchange. †Ex Dividend. ‡Assessment Paid. §Holiday. Total sales, 95,382 shares.

SAN FRANCISCO.*

Name of Company.	Location.	Capitalization.	July 31. H.	July 31. L.	Aug. 1. H.	Aug. 1. L.	Aug. 3. H.	Aug. 3. L.	Aug. 4. H.	Aug. 4. L.	Aug. 5. H.	Aug. 5. L.	Aug. 6. H.	Aug. 6. L.	Sales
Central Eureka.	Cal.	$400,000	.86	.83											2,160
Colehan.	Nev.	1,000,000													
Esperanza.	Nev.	1,000,000	.05		.05		.07	.06	.06		.06		.06		39,100
Gipsy Queen.	Nev.	750,000	.28	.27			.28	.27			.28				2,000
Gold Min. Con.	Nev.	750,000													
Lucky Tom.	Nev.	1,000,000													
MacNamara.	Nev.	500,000	.19						.21		.20		.20		800
Mont-Tonopah.	Nev.	1,000,000	1.05		1.05	1.02½			1.15	1.02½	1.10	1.05½			2,800
New York Tonopah.	Nev.	1,000,000	.07				.07		.09	.08			.07		1,000
Paymaster.	Nev.	750,000					.15				.15				600
Rescue.	Nev.	500,000	.15	.14			.15						12		1,400
Tonopah-Belmont.	Nev.	2,000,000	2.25								1.95		1.92½		625
Tonopah & Cal.	Nev.	2,000,000	.39	.39	.40	.38	.38		.40	.38	.38		.38	.36	6,300
Tonopah Fraction.	Nev.	750,000													
Tonopah Midway.	Nev.	1,000,000													
Tonopah Mg. Co.	Nev.														
Tonopah North Star.	Nev.	750,000	.53	.50	.55	.51	.54	.51	.53	.51	.51		.51	.50	12,100
Tonopah & Salt Lake.															
Tonopah Union.	Nev.	750,000													
United Tonopah.	Nev.	1,000,000			.16										1,000

*San Francisco & Tonopah Mining Exchange. Total sales 69,885 shares.

COAL, IRON AND INDUSTRIAL STOCKS.*

Name of Company.	Par val.	Shares Issued.	Aug. 5 H.	Aug. 5 L.	Aug. 6 H.	Aug. 6 L.	Aug. 7 H.	Aug. 7 L.	Aug. 8 H.	Aug. 8 L.	Aug. 10 H.	Aug. 10 L.	Aug. 11 H.	Aug. 11 L.	Sales
Allis-Chalmers, U. S.	$100														
Allis-Cham's, pf, U. S.	100	200,000			80										41
Am. Agr. Chem., U. S.	100										18¾				12
Am. Agr. Chem. pf, U. S.	100	181,350													
Am. Sm. & Ref., U. S.	100	500,000	41½	40¼	42½	39½	42¾	41½	41½	40½	42¼	39½	42		22,220
Am. Sm. & Ref., pf, U. S.	100	500,000	89	87¾	89¼	87	89⅞	89¼	87⅝	87	87¼	86½	87¾		3,605
Am. Steel & Fdy., U. S.	100		10				10		10						1,100
Am. S. & Fdy., U. S.	100	155,000							50						400
Col. Fuel & I., Colo.	100	239,320	42½	42	44	40½	44	43					43	42½	2,770
Col. & H. C. & I., Colo.	100	69,244	14	12½	12	11½	13⅝	12½	11½	11	12¾	11½	13¾	13¼	2,460
†Crucible Steel, U. S.	100	250,000	11⅛	10⅞	11	10⅜	11		10⅞	10¾	11	10¾	10⅞	10½	2,640
†CrucibleSteel, pf, U. S.	100	250,000	72½	72	73	72	72⅜	72½	72	71⅜	71¾	71¼	72	71	1,612
†Mong. R. Coal, Pa.	50	200,000	10¼	10	10¼				10½	10¼	10¼				345
†Mong. R. Coal, pf, Pa.	50	98,300	38¼	37¾	38		38	37¾	37¾		37½		37½		330
National Lead, U. S.	100	149,054	14	13	13				13¼	13⅛			13⅛		1,590
National Lead, pf, U. S.	100	149,040			81⅝		81¼	81					81⅛	81	510
†Phila. Nat. Gas.	100	308,542			38½	38⅜	38¼	38¼							700
†Phila. Nat. Gas, pf.	100	212,873													
†Pittsburg Coal, Pa.	100	300,307	27	26	27	25½			26¾	26⅝	26		26¾	26⅜	1,970
†Pittsburg Coal, pf, Pa.	100	297,012	84⅛	83	82½	82¼	83	82½	83		83		83	82¾	803
Republic I. & S., U. S.	100	273,520	11	10	11	8⅞	11	10¾	10½		10⅜	.0	11⅛	10⅜	9,000
Republic I. & S., pf, U. S.	100	203,569	63	61½	60½	59	62	61	61¼	61	61	60	62	61	9,845
Sloss-Shef S. & I., Ala.	100	75,000	31	30	31	29	32	31½	30½	30	31	29¾	31		3,300
Sloss-Shef S. & I. pf, Ala.	100	65,085	83												100
Standard Oil, U. S.	100	970,000	595	589	590	580¼	595	589	590	589	590	586	595	589½	440
Tenn. C. I. & R. R.	100	225,000	37¾	35½	37¾	35⅓	38	36¼	35¼	33½	34¾	32¾	36	34½	17,625
U. S. Red. & Ref., U. S.	100	59,188													
U. S. Red. & Ref., pf, U. S.	100	39,485													
U. S. Steel Corp., U. S.	100	5,084,952	22½	20⅜	21⅞	20⅜	22¼	21½	21⅝	20⅝	21⅛	20⅝	21¾	21	25457⅝
U. S. Steel Crop. pf, U. S.	100	5,103,141	70⅜	68¼	70	68	70⅛	68⅝	69	68	68¾	67	69½	68¼	136405
Va.-Car Chem., U. S.	100	279,844	23¼	21	26½	23	27¾	23¼	24	22½	24	22⅜	23¾	22½	44,513
Va.-Car Chem., pf, U. S.	100	120,000	85	80	88¼	86¼	92	90	91¾	90	90				1,750
Va. I. C. & Coke, U. S.	100	86,416	20¼	29	20	20	22		22½				23		1,275

*New York Stock Exchange. †Pittsburg Stock Exchange. ‡Ex-dividend. Total sales 521,937

COLORADO SPRINGS, COLO.*

Name of Company.	Par Val	Shares Listed.	Aug. 1 H.	Aug. 1 L.	Aug. 3 H.	Aug. 3 L.	Aug. 4 H.	Aug. 4 L.	Aug. 5 H.	Aug. 5 L.	Aug. 6 H.	Aug. 6 L.	Aug. 7 H.	Aug. 7 L.	Sales
Acacia.	$1	1,500,000	.07½	.06½	.07¼	.06¼	.07	.06¾	.06¾	.06	.07	.06	.06¼	.05½	5,200
Am. Con.	1	2,000,000	.02		.02		.02		.02		.02½		.02½		
Anaconda	5	1,000,000	.11	.10½	.11	.10	.10¾	.10½	.10¾		.11½	.11	.11⅝		2,500
Ben Hur.	1	900,000	.02		.02½	.01½	.01½		.02¾		.02½		.02¼		
Blue Bell.	1	1,000,000	.06	.05	.05¾	.05	.05½	.05	.04½		.05¾	.04½	.05½	.04½	2,000
C. C. & M.	1	1,000,000	.02½	.02¼	.02⅝	.02¼	.02½	.02⅛	.02⅝	.02⅛	.02⅝	.02¼	.02¼		
C. K. & N.	1	1,250,000	.20	.19½	.19⅝	.19	.19⅝	.19	.19¾	.18	.20	.19	.02¼		1,000
C. C. Con.	1	2,000,000	.04½	.04	.05	.04	.04		.04		.04		.04½	.04	400
Coriolanus.	1	1,500,000	.02½		.02½		.02½		.02½		.02½		.02¼		
Des Moines.	1	750,000	.03½	.02½	.03½	.02¼	.03⅝	.02¼	.03¾		.03⅜	.02¼	.03¼	.02½	
Dr. Jack Pot.	1		.09	.08½	.09	.08½	.09	.08¾	.08⅞	.08¾	.09	.08¾	.09	.08⅞	1,000
El Paso.	1	1,250,000	.42	.40	.42	.40½	.42	.41½	.41	.42	.41	.44	.41½		8,221
Elkton Con.	1	800,000	.59	.58	.58¾	.58½	.59¼	.59	.59¼	.59	.60	.59	.60	.59½	5,100
Fannie Rawlings.	1	1,000,000	.03	.02	.02½	.02¼	.02⅝	.02⅜	.02½	.02⅛	.02½	.02	.02¼	.02¼	6,000
Findley.	1	1,250,000	.14¼	.13½	.13⅝	.13	.14	.12½	.14	.12	.14	.13	.14		1,000
Gold Bond.	1	1,000,000	.02		.02		.02		.02½		.02		.02		1,000
Gold Dollar Con.	1		.04¾	.03½	.04⅛	.04	.04¼	.04⅜	.04¾	.04⅛	.04¾	.04½	.04⅜		12,250
Golden Cycle.	1	2,000,000	.66	.63¾	.68	.63¾	.66	.64	.63¼		.68	.65	.67	.65	1,000
Golden Fleece.	1	600,000	.25		.25	.06	.20	.06	.25	.06	.25		.02¼	.02	6,000
Gould	1	1,250,000	.03		.02½	.02	.02½	.02	.02¼	.02	.02¾	.02	.06		
Hart.	1	1,000,000	.04	.02	.04	.02	.04	.02	.04	.02	.04	.02	.04	.02	
Isabella	1	2,500,000	.10¾	.10¼	.10⅝	.10½	.11	.10⅞	.12	.11	.11		.13½	.11	6,000
Jack Pot.	1	1,250,000													
Last Dollar.	1	1,500,000	.50		.50		.50		.50		.50		.50		
Lexington.	1	1,500,000	.03⅝	.03½	.03⅝	.03½	.03⅝	.82¼	.03		.03½	.03	.03½	.03¼	3,000
Little Puck.	1	2,000,000	.03	.02	.02		.02		.03	.02	.03	.02	.03	.02	
Mollie Gibson	5	1,000,000	.05½		.06		.06		.06		.05½		.05½		
Moon-Anchor.	1	600,000	.08⅞	.08¼	.10	.08	.09	.08¼	.09	.08¼	.09	.08	.10	.09	4,000
New Haven.	1	1,500,000	.03¼	.02½	.02¾	.02½	.02⅛		.0 7⅛	.02½	.02⅞		.02⅝	.02½	400
Pharmacist, Con.	1	1,500,000	.03½	.03	.03½	.03	.03¼	.03	.03½	.03¼	.03¼	.03	.03½	.03¼	8,000
Pinnacle.	1	2,000,000	.03½		.03½		.03½		.03½		.03½		.03½		
Pointer.	1	1,250,000	.01½	.008	.01½	.008	.01¼		.01¾		.01¾	.009	.003		
Portland.	1	3,000,000	1.25	1.15	1.23	1.20	1.35	1.20	1.21½	1.20	1.25	1.20	1.22½	1.20	5,700
Prince Albert.	1	3,000,000	.02½	.02	.03	.02	.02½	.02	.02	.02	.02		.02½	.02	
Vindicator	1	1,500,000	.90		.85		.90		.90		.90		.90		
Work	1	1,500,000	.05⅞	.05	.05¼	.05	.05¼	.05½	.05¾	.05½	.05¾	.05⅜	.05¾	.05⅝	.05¼	3,000

*Colo. Springs Mining Stock Exchange. All mines are in Colorado. Total sales 84,861 shares.

COLORADO SPRINGS (By Telegraph).

Name of Company.	Aug. 10. H.	Aug. 10. L.	Aug. 11. H.	Aug. 11. L.	Name of Company.	Aug. 10. H.	Aug. 10. L.	Aug. 11. H.	Aug. 11. L.
Acacia.	.06	.05½	.06¼	.05	Isabella.	.11½	.10⅝	.11	.10½
Am. Con.	.02½	.01½	.02½	.01½	Jack Pot.	.10	.07	.10	.07
Anaconda	.11⅜	.11⅛	.12	.10	Keystone.	.04	.02	.04	.02
Blue Bell	.05½	.04½	.05½	.04½	Last Dollar.	.50	.35	.50	.35
Cripple Creek Con.	.05	.04	.04⅜	.03½	Lexington.	.03¼	.03¼	.03½	.03¼
C. K. & N.	.19⅜	.19⅛	.19⅜	.19⅛	Little Puck.	.03	.02	.03	.02
Doctor Jack Pot	.09	.08½	.09	.08½	Mollie Gibson.	.06	.05	.06	.05
Elkton Con	.42	.40½	.41	.40¼	Moon Anchor.	.10	.08¾	.09	.08
El Paso.	.60	.59½	.60	.58	Old Gold.	.07	.06¾	.06⅝	.06
Findley	.13¾	.13	.14	.13½	Pharmacist	.03½	.03¼	.03⅜	.03¼
Gold Dollar Con.	.04¼	.04⅛	.04¼	.04	Pinnacle.	.03⅜	.03	.03⅝	.03
Golden Cycle.	.69	.65	.69½	.65¼	Portland.	1.22	1.20	1.22	1.20
Golden Fleece.	.20	.06	.20	.06	Vindicator.	.85	.70	.85	.70
Gould	.02¼	.02	.02¾	.02	Work.	.05⅝	.05¼	.05⅝	.05¼

SAN FRANCISCO (By Telegraph).

Name of Company.	Shares Issued.	August. 10.	August. 11.	Name of Company.	Shares Issued.	August. 10.	August. 11.
Belcher	104,000	.36	.34	Justice.	105,000	.13	.13
Best & Belcher.	100,800	2.00	1.80	Mexican.	100,800	1.20	1.25
Caledonia.	100,000	1.38	1.25	Occidental Con.	100,000	.35	.39
Challenge Con.	50,000	.40	.36	Ophir.	100,800	1.75	1.70
Chollar.	112,000	.18	.17	Overman.	115,200	.24	.23
Confidence.	24,960	1.20	1.10	Potosi.	112,000	.18	.17
Con. Cal. & Va.	216,000	1.40	1.35	Savage.	112,000	.18	.17
Con. Imperial.	500,000	.04	.04	Sierra Nevada.	100,000	.65	.66
Crown Point.	100,000	.18	.17	Union Con.	100,000	.85	.86
Gould & Curry.	108,000	.38	.38	Utah Con.	100,000	.31	.31
Hale & Norcross.	112,000	.49	.47	Yellow Jacket.	120,000	.65	.63

STOCK QUOTATIONS

MEXICO*. July 31.

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Durango:				
Ca. Min. de Penoles	2,500	$50.00	$3,800	$4,100
San Andres de la Sierra	200	.....	10,000	.....
Guanajuato:				
Angustias, Pozos	2,400	5.00	95	100
Cinco Senores y An., aviadoras	2,000	15.00	205	215
Cinco Senores y An., aviada	400	10.00	180	195
Providencia, SanJuan de la Luz	6,000	2.00	150	160
Queensland y Australia	300	.....	90	100
Guerrero:				
Delfina, 1st serie	2,500	.....	40	45
Delfina, 2nd serie	2,500	.....	30	35
Garduno y Anexas	7,200	.....	45	60
Hidalgo:				
Amistad y Condordia	9,000	6.90	90	90½
Carmen, aviada	1,100	.....	140	160
Guadalupe Fresnillo Mill	1,000	.....	200	250
Guadalupe Fresnillo Mine	1,400	.....	70	80
La Blanca, aviadora	1,538	.....	.....	.....
La Blanca, aviada	708	.....	.....	.....
La Reina y An., aviadora	5,000	.....	25	26
Luz de Maravillas, aviadas	1,100	.....	.....	20
Maravillas y An., aviador	1,680	.....	120	180
Maravillas el Lobo	1,000	.....	130	180
Palma y An., aviador	1,800	.....	.....	12
Real del Monte	2,554	10.00	.....	.....
Refugio, aviada	12,800	.....	6	8
Santa Anay An., aviadora	1,800	.....	30	40
Santa Anay An., aviada	600	.....	25	30
Sta. Gertrudis y An., aviadas	9,000	.....	10	12
Sta. Gertrudis y An., aviadora	28,800	1.00	91	92
Santo Tomas Apostol aviadoras	5,100	.....	2	3
San Felipe de Jesus, aviadora	3,600	.....	27	28
San Felipe de Jesus, aviada	1,200	.....	10	15
San Rafael y An., Trompillo	1,200	12.00	1,430	1,460
San Rafael y An., aviada	1,203	4.00	560	570
Soledad, aviada	900	.....	440	470
Sorpresa, aviada	960	5.00	320	330
.....	.....	.....	.....	.....

Name of Company.	Shares Issued.	Last div'd	Prices. Bid.	Prices. Ask.
Mexico:				
Alacran	2,400	.....	60	70
Aldebarren	.....	.....	150	160
Buen Despacho	2,000	.....	125	130
Dos Estrellas	3,000	30.00	3,550	3,570
La Esperanza (El Oro.)	3,000	10.00	1,500	1,500
La Reformia, aviadores	2,000	.....	95	105
Providencia, pagadoras	1,600	.....	.....	.....
Providencia, liberadas	900	.....	.....	.....
Santa Ana, Esperanza	2,400	.....	70	90
Michoacan:				
Luz de Borda, aviadora	3,000	.....	110	120
Luz de Borda, aviado	1,000	.....	50	52
Nuevo Leon;				
La Fraternal	1,000	.....	550	600
Norias de Bajan	1,000	.....	700	800
Santiago y An., Tlal.	4,000	.....	.....	.....
San Luis Potosi:				
Concepcion y An	3,000	.....	90	100
El Barreno, aviadora	2,000	2.00	30	33
Sta. Maria de la Paz	2,400	20.00	720	740
San Diegoy Annexas	2,400	4.00	22	28
Zacatecas:				
Asturiana y An	2,500	.....	55	65
Candelaria y Pinos	2,500	10.00	250	260
Cubiertas	2,400	.....	.....	.....
Esperanza y An	2,400	.....	30	50
Lourdes	2,500	.....	35	45
Luz de Minillas, pagadoras	2,000	.....	10	15
Nueva Quebradilla, aviadoras	2,400	.....	95	105
Nueva Quebradilla, aviadas	600	.....	60	80
San Carlos y Annexas	2,500	20.00	130	150
Sta. Maria de Gaud	2,500	10.00	75	85
Miscellaneous:				
Bartolome de Medina	2,000	1.50	70	73
Guadalupe Hacienda	20,000	6.00	.....	.....
La Luz Hac. (Pachuca.)	3,750	.....	.....	.....
La Reina (Chihuahua.)	192	.....	.....	.....
Naica (Chihuahua.)	100	.....	11,000	13,000
Natividad (Oaxaca) aviadora	1,800	10.00	1,000	1,080
Natividad (Oaxaca) aviadas	600	4.00	.....	.....
San Francisco Hac	6,000	1.00	57	59
Santa Ana Huantla Morelos	4,000	.....	.....	.....
Union Hacienda	3,000	5.00	225	240

*Values are in Mexican currency.

SALT LAKE CITY.* Aug. 8.

Name of Company	Par Val	Shares.	High	Low	Sales.
Ajax	$10	300,000	.....	.....	.....
Butler-Liberal	1	500,000	13¾	.13	1,000
Carisa	1	300,000	.08	.08	1,000
California	1	500,000	.14	.12	9,700
Century	.....	.....	.40	.40	100
Con. Mercur	5	1,000,000	1.55	1.51½	3,650
Daly	20	150,000	.....	.....	.....
Daly-Judge	1	300,000	9.75	9.40	25
Daly-West	20	300,000	39.00	38.00	197
Grand Central	1	250,000	4.35	4.35	100
L. Mammoth	1	150,000	.78	.66	6,200
L. Washington	½	300,000	.....	.....	.....
Mammoth	25	400,000	.....	.....	.....

Name of Company	Par Val	Shares	High	Low	Sales.
Majestic Cop	.....	.....	.....	.....	.....
May Day	¼	400,000	.13¼	.07½	29,500
M. Washington	.....	.....	.02½	.01¾	15,500
N. Y. Bonanza	.....	.....	.30¾	.21	7,600
Sacramento	5	1,000,000	.26	.23	18,460
Star Con	.....	.....	.26	.17	11,825
Silver Shield	1	300,000	.19	.13	15,600
Tetro	1	500,000	.06	.05	5,500
Uncle Sam Con	1	500,000	.23	.19	4,500
Utah Con	10	100,000	.50	.50	200
Victor	1	500,000	.50	.14½	1,500
Wabash	.....	.....	.....	.15½	11¼	1,265
Yankee Con	1	500,000	.33½	.30	3,600

*By our Special Correspondent. All mines are in Utah. Total sales, 125,022 shares.

ST. LOUIS, MO. Aug. 8.

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Am.-Nettie, Colo	$10	300,000	$0.50	$0.75
Catherine Lead, Mo.	10	50,000	1.25	2.25
Central Coal & C	100	51,250	60.50	63.00
Central C. & C., pf.	100	18,750	73.00	74.00
Central Lead, Mo	10	100,000	100.00	120.00

Name.	Par Val.	Shares.	Prices. Bid.	Prices. Ask.
Columbia Lead, Mo.	$10	50,000	$10.00	12.00
Con. Coal, Ill.	100	50,000	21.00	22.75
Doe Run Lead Co.	100	15,000	112.00	120.00
Granite Bimet. Mt.	10	100,000	.30	.40
St. Joe Lead, Mo.	10	600,000	15.75	17.00

*By our Special Correspondent.

PHILADELPHIA, PA.*

Name and Location of Co.	Par val.	Aug. 5. H.	Aug. 5. L.	Aug. 6 H.	Aug. 6 L.	Aug. 7. H.	Aug. 7. L.	Aug. 8. H.	Aug. 8. L.	Aug. 10. H.	Aug. 10. L.	Aug. 11. H.	Aug. 11. L.	Sales
Am. Alkali, Mich	$50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Am. Cement	10	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	25
Cambria Iron, Pa	50	.....	.....	.....	.....	.....	.....	42¾	.....	47	.....	.....	.....	21
Cambria S., Pa	50	21	20¼	20⅛	20	21	20¼	20⅛	20⅛	20½	20¼	21	20⅝	8,356
Penn. Steel, pfd	100	.....	.....	85	.....	.....	.....	.....	.....	.....	.....	8	.....	205
Susq. I & S., Pa	5	1⅜	.....	1⅝	1⅛	1⅛	.....	1⅛	.....	.....	.....	1⅛	1⅛	1,595
United Gas I. Pa	50	83	81½	83	80	83¼	82¾	82¾	81½	83	81	83	82½	5,323
Warwick I. & S.	10	4¼	.....	4⅛	.....	4⅛	4¼	4⅛	.....	.....	.....	4⅛	.....	1,200

*Reported by Townsend, Whelen & Co., 309 Walnut St., Philadelphia, Pa. Total sales 16,734 shares,

LONDON. July 30.

Name and Country of Company.	Shares Issued.	Par value. £. s. d.	Latest dividend. Amt. s. d.	Latest dividend. Date.	Quotations. Buyers. £. s. d.	Quotations. Sellers. £. s. d.
Alaska-Treadwell, g., Alaska	200,000	5 0 0	3 0	Apr., 1903	4 7 6	4 12 6
Anaconda, c. s., Montana	1,200,000	5 0 0	2 0	May, 1903	3 13 9	3 16 3
*Arizona, c., Def., ord	63,444	1 0 0	5 6	Aug., 1903	7 0 0	7 10 0
*Arizona, pref., ord	316,350	1 0 0	5 6	Aug., 1903	7 2 6	7 7 6
*Camp Bird, g., Colorado	738,000	1 0 0	1 6	July 1903	1 3 9	1 6 3
Central Chile, C., Chile	276,248	1 0 0	.. 6	Jan., 1902	3 0	4 0
Copiapo, c., Chile	112,500	2 0 0	6 10	May, 1903	1 5 0	1 10 0
De Lamar, g. s., Idaho	80,000	1 0 0	2 0	Nov., 1902	10 0	12 6
El Oro, g., Mexico	1,000,000	1 0 0	1 6	July. 1903	1 11 3	1 13 9
Frontino & Bolivia, g., Columbia	128,682	1 0 0	3 0	July, 1901	16 3	18 9
Le Roi, g., British Col	200,000	5 0 0	5 0	Nov., 1899	17 6	1 0 0
Le Roi No. 2, g., British Col	120,000	5 0 0	5 0	May, 1902	1 1 3	1 3 9
Mesquital, Mexico	250,000	2 0	3	Feb., 1903	2 6	3 6
Montana, g. s., Montana	657,128	1 0 0	6	April 1899	1 9	2 3
Mountain, c., Cal	250,000	5 0 0	2 4½	May. 1903	2 17 6	3 2 6
Stratton's Independence, Colorado	1,000,007	1 0 0	1 0	Aug., 1903	7 9	8 3
St. John del Rey., g., Brazil	546,265	1 0 0	8	June, 1903	16 0	17 0
Utah Con., g. c. (Highland Boy), Utah	300,000	1 0 0	6 3	July, 1903	5 0 0	5 10 0
Ymir, g., British Col	200,000	1 0 0	1 0	Mar., 1902	5 0	7 6
European:						
Linares, l., Spain	15,000	3 0 0	1 0	Mar., 1903	2 0 0	2 10 0
Mason & Barry, c., sul., Port'g'l	185,172	1 0 0	11 0	May, 1903	3 10 0	3 15 0
Rio Tinto, c., Spain	325,000	5 0 0	27 6	May, 1903	46 5 0	46 10 0
Rio Tinto, pref., Spain	325,000	5 0 0	2 6	May, 1903	6 2 6	6 7 6
Thersis, c., Spain	625,000	2 0 0	6 0	May, 1903	3 17 6	4 2 6
Australia and New Zealand:						
*Assoc. Gold Mines, W. Australia	495,388	1 0 0	2 0	July, 1903	1 16 3	1 18 9
Brisels, tin, Tasmania	600,000	1 0 0	.....	.....	5 9	6 3
Broken Hill Pr'p, s., N. S. Wales	980,000	8 0	1 0	Aug., 1903	1 8 6	1 9 6
Cosmopolitan Prop., W. Australia	385,000	1 0 0	1 0	May, 1903	14 0	14 6
Golden Horse Shoe, W. Australia	300,000	5 0 0	6 0	Apr., 1903	8 0 0	8 2 6
*Great Fingall Con., W. Australia	250,000	1 0 0	5 0	Apr., 1903	7 10 0	7 12 6
Great Bo'd'r Pr'p, W. Australia	1,750,000	2 0	6	June, 1903	1 7 0	1 7 6
*Ivanhoe Gold Corp., W. Australia	200,000	5 0 0	4 0	Apr., 1903	8 3 9	8 6 3
Kalgurli, g., W. Australia	120,000	1 0 0	2 6	July, 1903	4 1 3	4 3 9
Lake View Cons., g., W. Australia	250,000	1 0 0	rts.	Aug., 1902	2 8 9	2 10 0
Mt. Lyell M. & R. L., c., Tasmania	275,000	3 0 0	1 0	July, 1903	2 18 9	3 1 3
Mt. Morgan, g., Queensland	1,000,000	1 0 0	3	Aug., 1903	2 17 6	3 0 0
Waihi, g., New Zealand	497,412	1 0 0	2 6	June, 1903	5 5 0	5 7 6
Indian:						
Champion Reef, g., Colar Fields	473,000	10 0	5 6	Aug.. 1903	7 16 3	7 18 9
*Mysore Gold, Colar Fields	566,043	10 0	4 0	July, 1903	6 15 0	6 17 6
*Nundydroog, g., Colar Fields	484,000	10 0	1 6	Mar., 1903	2 10 0	2 11 3
Ooregum, g., Colar Fields	343,000	10 0	1 9	Aug., 1903	1 12 6	1 15 0
Ooregum, g., pref., g., Colar Fields	240,000	10 0	1 9	Aug., 1903	2 1 3	2 3 9
African:						
Angelo, g., Transvaal	600,000	1 0 0	6 0	Aug., 1903	6 15 0	7 0 0
Bonanza, g., Transvaal	200,000	1 0 0	10 0	Aug., 1903	3 17 6	4 2 6
British South Africa	4,436,019	1 0 0	rts.	May, 1889	2 8 9	2 10 0
Cape Copper, S. Africa	300,000	2 0 0	1 0	July, 1903	2 8 9	2 11 3
Cape Copper, pref., S. Africa	75,000	2 0 0	1 0	July, 1903	2 7 6	2 12 6
City and Sub'n (New), g., Transvaal	340,000	4 0 0	4 0	Aug., 1903	6 2 6	6 7 6
Crown Reef, g., Transvaal	120,000	1 0 0	4 0	Aug., 1903	16 10 0	17 0 0
De Beers Con., d., pref., Cape Colony	800,000	2 10 0	10 0	July, 1903	19 1 3	19 3 6
De Beers Con., def	1,000,000	2 10 0	15 6	Mar., 1903	19 15 0	19 17 6
East Rand, Prop., Transvaal	970,000	1 0 0	5 0	Aug., 1903	6 15 0	6 16 3
Ferreira, g., Transvaal	90,000	1 0 0	15 0	Aug., 1903	20 10 0	21 0 0
Geldenhuis Est., g., Transvaal	200,000	1 0 0	6 0	Aug., 1903	6 0 0	6 2 6
Geduld, g., Transvaal	400,000	1 0 0	rts.	Mar., 1902	6 0 0	6 2 6
Henry Nourse, g., Transvaal	125,000	1 0 0	10 0	Aug., 1903	8 10 0	8 15 0
Jagersfontein, d., Orange, F. S	200,000	5 0 0	6 0	Nov., 1889	28 15 0	29 5 0
Jubilee, g., Transvaal	50,000	1 0 0	5 0	July, 1903	4 15 0	5 0 0
Jumpers, Transvaal	100,000	1 0 0	5 0	Aug., 1899	3 5 0	3 10 0
Langlaagte Est., g., Transvaal	470,000	1 0 0	3 0	Aug., 1903	3 13 9	3 16 3
May Con., g., Transvaal	288,750	1 0 0	3 0	Aug., 1903	4 0 0	4 2 6
Meyer & Charlton, g., Transvaal	100,000	1 0 0	3 0	Aug., 1903	4 17 6	5 2 6
Modderfontein, g., Transvaal	290,000	1 0 0	rts.	Apr., 1902	8 13 9	8 16 3
Namaqua, c., Cape Colony	94,331	2 0 0	2 0	June, 1903	2 15 0	3 0 0
Primrose (New), g., Transvaal	325,000	1 0 0	2 0	Aug., 1903	3 15 0	3 17 6
Rand Mines, g., S. Africa	1,795,956	5 0	4 0	Aug., 1902	9 8 9	9 11 3
Robinson, g., Transvaal	750,000	5 0 0	5 6	Aug., 1903	10 0 0	10 5 0
Robinson Deep, g., Transvaal	950,000	1 0 0	2 0	Aug., 1903	4 10 0	4 15 0
Rose Deep, Transvaal	425,000	1 0 0	2 0	Aug., 1903	8 2 6	8 7 6
Salisbury, g., Transvaal	100,000	1 0 0	2 0	Mar., 1899	2 5 0	2 10 0
Sheba, g., Transvaal	1,075,000	1 0 0	6	July, 1599	16 3	17 6
Village Main Reef, Transvaal	400,000	1 0 0	4 0	June, 1903	7 10 0	7 15 0
Wemmer, Transvaal	80,000	1 0 0	10 0	July, 1903	11 0 0	11 10 0

c.—Copper. d.—Diamonds. g.—Gold.* l.—Lead. s.—Silver. Ex-Dividend.

LONDON (By Cable.)*

Name of Company.	August 4. £. s. d.	August 11. £. s. d.	Name of Company.	August 4. £. s. d.	August 11. £. s. d.
Anaconda	3 15 0	3 12 6	Jagersfontein	28 17 6	28 17 6
British South Africa	2 8 9	2 12 6	Johannesburg Invest	2 17 6	3 0 0
Camp Bird	1 6 3	1 7 0	Modderfontein	9 17 6	9 15 0
Con. Gold Fields	6 3 9	6 10 0	Rand Mines	9 8 9	9 15 9
De Beers Con. def	19 15 0	19 12 6	Rio Tinto, com	48 12 6	48 10 0
East Rand	6 17 6	7 8 0	Simmer & Jack	1 5 6	1 8 9
El Oro, Mex	1 12 6	1 12 6	Tomboy	1 15 0	1 12 6

*Furnished by Wm. P. Bonbright & Co., 15 Wall St., New York.

PARIS. July 30.

Name of Company.	Country.	Product.	Capital Stock. Francs.	Par value. Fr.	Latest divs. Fr.	Prices. Opening. Fr.	Prices. Closing. Fr.
Boleo	Lower Cal.	Copper	.....	500	176.00	1,370.00	1,374.00
Champ d'Or	S. Africa	Gold	3,375,000	25	3.75	18.75	18.75
Fraser River	Brit. Col'mb.	Gold	250,000	25	.....	5.50	5.50
Huanchaca	Bolivia	Silver	40,000,000	125	5.00	90.50	90.50
Laurium	Greece	Zinc, Lead	16,300,000	500	25.00	345.00	342.00
Metaux, Cie. Fran. de	France	Metal dealers.	25,000,000	500	22.50	471.00	472.00
Nickel	N. Caled'nia	Nickel	15,000,000	250	22.50	450.00	455.00
Sedalia & California	Calif., U. S.	Oil	1,000,000	1	.....	8.25	8.25
Vielle Montagne	Belgium	Zinc	9,000,000	30	30.00	664.00	675.00

TORONTO, ONT.*

Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.	Name of Company.	Par val	Prices. High.	Prices. Low.	Sales.
Black Tail	$1	.04	.02	.....	Granby Smelter	$10	4.60	3.75	.....
Cariboo (Mc. K.)	1	.13	.12	.....	Mountain Lion	1	.28	.20	.....
Cariboo (Hyd.)	1	.75	.....	.....	North Star	1	.14	.11	.....
Center Star	1	.30	.25	.....	Nova Scotia Steel, com	100	.87½	.82	.....
Crows Nest, C.	100	3.50	2.75	.....	Payne	1	.21	.17	.....
Dominion Coal, com.	100	.99	.81½	25	Rambler Cariboo	1	.45	.35	.....
Dominion S. & I.	100	.12	.08	.....	Republic	1	.03	.01	.....
Dominion S. & I., pref.	100	.....	.....	.....	St. Eugene	1	.48	.40	.....
Fairview	1	.12	.03	.....	Virtue	1	.07	.06	.....
Giant	1	.04	.03	.....	War Eagle Con.	1	.14	.11	.....

*Standard Stock and Mining Exchange. Total sales, 25 shares.

CHEMICALS, MINERALS, RARE EARTHS, ETC.—CURRENT WHOLESALE PRICES.

(See also Market Reviews.)

	Cust.	Meas.	Price.
ABRASIVES—			
Carborundum, f.o.b. Niagara Falls, Powd., F. FF. FFF.	lb.		$0.08
Grains	"		.10
Corundum, N. C.	"		.07@.10
Chester, Mass.	"		.04½@.05
Barry's Bay, Ont.	"		.07½@.09¼
Mont. car-lots, f.o.b. Chicago	"		.07@.07½
Crushed Steel, f.o.b. Pittsburg	"		.05½
Emery, Turkish flour in kegs	"		.03¼
Grains, in kegs	"		.05@.05½
Naxos flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Chester flour, in kegs	"		.03½
Grains, in kegs	"		.05@.05½
Peekskill, f.o.b. Easton, Pa., flour, in kegs	"		.01½
Grains, in kegs	"		.02¼
Crude, ex-ship N. Y.; Abbott (Turkey)	lg. ton		26.50@30.00
Kuluk (Turkey)	"		22.00@24.00
Naxos (Greek) h. gr.	"		26.00
Garnet, as per quality	sh. ton		25.00@35.00
Pumice Stone, Am. Powd.	lb.		.01@.02
Italian, powdered	"		.01¼
Lump, per quality	"		.04@.40
Rottenstone, ground	"		.02½@.04¼
Lump, per quality	"		.06@.20
Rouge, per quality	"		.10@.30
Steel Emery, f.o.b. Pittsburg	"		.07
ACIDS—			
Boracic, crystals	"		.10¼@.11
Powdered	"		.11¼@.11½
Carbonic, liquid gas	"		.12½
Chromic, crude	"		.20
Hydrofluoric, 30%	"		.03
48%	"		.05
60%	"		.11
Sulphurous, liquid anhy. f.o.b. Bound Brook, N.J.	"		.06
ALCOHOL—Grain	gal.		2.39@2.40
Refined wood, 95@97%	"		.60@.65
Purified	"		1.20@1.50
ALUM—Lump	100 lbs.		1.75
Ground	"		1.85
Porous	"		1.00
Powdered	"		3.00
Chrome, com'l	"		2.75@3.00
ALUMINUM—			
Nitrate	lb.		1.50
Oxide, com'l, common	"		.06½
Best	"		.20
Pure	"		.80
Hydrated	100 lbs.		2.60
Sulphate, com'l	"		1.25@1.50
AMMONIA—			
Aqua, 16°	lb.		.03
18°	"		.03¼
20°	"		.03¾
26°	"		.04½
AMMONIUM—			
Carbonate, lump	"		.07¼
Powdered	"		.08¼
Muriate	"		.05¾
Lump	"		.09
Nitrate, white pure (99%)	"		.12
Phosphate, com'l	"		.09
Pure	"		.12
ANTIMONY—Glass	"		.30@.40
Needle, lump	"		.04½@.06
Powdered, ordinary	"		.05¾@.07¾
Oxide, com'l white, 95%	"		.03½
Com'l white, 99%	"		.12
Com'l gray	"		.07
Sulphuret, com'l	"		.16
ARSENIC—White powd.	"		.02¾@.02¾
Red	"		.03½@.06½
ASPHALTUM—			
Ventura, Cal.	sh. ton		32.00
Cuban	lb.		.01½@.03½
Egyptian, crude	"		.05½@.06
Trinidad, refined	sh. ton		35.00
San Valentino (Italian)	lg. ton		16.00
Seyssel (French), mastic	sh. ton		21 00
Gilsonite, Utah, ordinary	lb.		.03
Select	"		.03¾
BARIUM—			
Carb. Lump, 80@90%	sh. ton		25.00@27.00
92@98%	"		26.00@29.00
Powdered, 80@90%	lb.		.01¾@.02
Chloride, com'l	100 lbs.		1.67½@1.76
Chem. pure cryst	lb.		.05
Nitrate, powdered	"		.05¾
BARIUM	Cust.	Meas.	Price.
Sulphate (Blanc Fixe)	lb.		$0.01¾
BARYTES—			
Am. Crude, No. 1	sh. ton		9.00
Crude, No. 2	"		8.00
Crude, No. 3	"		7.75
Floated	"		18.50
Foreign gray	"		13.50
Snow white	"		17.00
Floated	"		18.00
BAUXITE—Ga. or Ala. Mines:			
First grade	lg. ton		5.50
Second grade	"		4.75
BISMUTH—Subnitrate	lb.		2.00
Subcarbonate	"		2.25
BITUMEN—"B"	"		.03½
"A"	"		.05
BONE ASH	"		.02¼@.02½
BORAX	"		.07¼@.07½
BROMIDE—Bulk	"		.48
CADMIUM—Metallic	"		1.40
Sulphate	100 lbs.		2.00@2.50
CALCIUM—Acetate, gray	"		1.40
" brown	"		.95
Carbide, ton lots f.o.b. Niagara Falls, N. Y., for Jersey City, N. J.	sh. ton		70.00
Carbonate, ppt.	lb.		.05
Chloride	100 lbs.		.70@.90
CEMENT—			
Portland, Am., 400 lbs.	bbl.		2.00@2.15
Foreign	"		1.95@2.50
"Rosendale," 300 lbs.	"		.80
Slag cement	"		1.50@1.60
CERESINE—			
Orange and Yellow	lb.		.13
White	"		.14
CHALK—Lump, bulk	sh. ton		3.25
Ppt. per quality	lb.		.04@.05¼
CHLORINE—Liquid	"		.30
Water	"		.10
CHROME ORE			
(50% ch.) ex-ship N. Y.	lg. ton		24.75
Bricks f.o.b. Pittsburg	M		175.00
CLAY, CHINA—Am. com., ex-dock, N. Y.	lg. ton		8.25
Am. best, ex-dock, N. Y.	"		9.25
English, common	"		10.50
Best grade	"		16.25
Fire Clay, ordinary	sh. ton		4.25
Best	"		6.00
Slip Clay	"		5.00
COAL TAR PITCH	gal.		.08
COBALT—Carbonate	lb.		1.75
Nitrate	"		1.50
Oxide - Black	"		2.26@2.30
Gray	"		2.28@2.40
Smalt, blue ordinary	"		.06
Best	"		.20
COPPERAS—Bulk	100 lbs.		.47½
In bbls.	"		.52½
COPPER—Carbonate	lb.		.18@.19
Chloride	"		.25
Nitrate, crystals	"		.35
Oxide, com'l	"		.19
CRYOLITE	"		.06½
EXPLOSIVES—			
Blasting powder, A	25-lb. keg		.65
Blasting powder, B	"		1.40
"Rackarock," A	lb.		.25
"Rackarock," B	"		.18
Judson R.R. powder	"		.10
Dynamite (20% nitro-glycerine)	"		.13
(30% nitro-glycerine)	"		.14
(40% nitro-glycerine)	"		.15
(50% nitro-glycerine)	"		.16½
(60% nitro-glycerine)	"		.18
(75% nitro-glycerine)	"		.21
Glycerine for ultro (32-2-10° Be.)	"		.13¼@.13⅞
FELDSPAR—Ground	sh. ton		8.00@9.00
FLINT PEBBLES—Dan. Best.	lg. ton		14.75
French, Best	"		11.75
FLOURSPAR—			
Am. lump, 1st grade	sh. ton		14.40
2d grade	"		13.00
Gravel and crushed, 1st gr.	"		13.40
2d grade	"		12.40
Ground, 1st grade	"		17.80
Ground, 2d grade	"		16.50
Foreign, lump	"		8.00@12.00
Ground	"		11.50@14.00
FULLER'S EARTH	100 lbs.		.80
GRAPHITE—Am. f.o.b. Providence, R. I., lump	sh. ton		$8.00
Pulverized	"		30.00
Am. pulv., other than R. I., f. o. b., New York	"		45.00
Best flake	"		150.00
German, com. pulv	lb.		.01¼@.01¼
Best pulverized	"		.01¼@.02
Ceylon, common pulv	"		.02¾@.03¼
Best pulverized	"		.04@.08
Italian, pulv	"		01¼
GYPSUM—Ground	sh. ton		8.00@8.50
Fertilizer	"		7.00
Rock	lg. ton		4.00
English and French	"		14.00@16.00
INFUSORIAL EARTH—Gr'd.			
American best	"		20.00
French	"		37.50
German	"		40.00
IODINE—Crude	100 lbs.		2.45
IRON—Muriate	lb.		.05
Nitrate, com'l	"		.01¼
True	"		.04
Oxide, pure copperas color	"		.05@.10
Purple-brown	"		.02
Venetian red	"		.01@.01½
Scale	"		.01@.03
KAOLIN—(See China Clay.)			
KRYOLITH—(See Cryolite.)			
LEAD—Acetate, white	"		.08¼@.08½
Brown	"		.06¼@.06½
Nitrate, com'l	"		.06½
" gran.	"		.08¼
LIME—Com., abt. 250 lbs.	bbl.		.75
Finishing	"		.95
MAGNESITE—Greece.			
Crude (95%)	lg. ton		5.50@6.00
Calcined	sh. ton		15.50
Bricks, best imp., f.o.b. N.Y.	M.		155.00
" domes., per qual., f.o.b. Pittsburg	"		180.00@200.00
MAGNESIUM—			
Carbonate, light, fine pd.	lb.		.05
Blocks	"		.07@.09
Chloride, com'l	"		.01¾
Fused	"		.20
Nitrate	"		.60
Sulphate	100 lbs.		.75@.95
MANGANESE—			
Crude powd.			
70@75% binoxide	lb.		.01¼@.01½
75@80% binoxide	"		.01½@.02¼
85@90% binoxide	"		.02¼@.03¼
90@95% binoxide	"		.03¼@.05½
Carbonate	"		.16@.20
Chloride	"		.04
Ore, 50%, Foreign	unit		.18@.19
Domestic	"		.30
MARBLE—Flour	sh. ton		6.00@7.00
MERCURY—Bichloride	lb.		.77
MICA—N. Y. gr'nd, coarse	sh. ton		33.00@38.00
Fine	lb.		.00½@.02
Sheets, N. C., 2x4 in.	"		.30
3x3 in	"		.80
3x4 in	"		1.50
4x4 in	"		2.00
6x9 in	"		3.00
MINERAL WOOL—			
Slag, ordinary	sh. ton		19.00
Selected	"		25.00
Rock, ordinary	"		32.00
Selected	"		40.00
NICKEL Oxide, No. 1	lb.		1.00
No. 2	"		.60
Sulphate	"		.20@.21
OILS—Black, reduced 29 gr.:			
25@30, cold test	gal.		.13@.13½
15, cold test	"		.14@.14½
Zero	"		.18½@.19
Summer	"		.13@.13½
Cylinder, dark steam ref.	"		.14½@.15½
Dark, filtered	"		.18½@.19
Light, filtered	"		.20½@.21
Extra cold test	"		.25@.31
Gasoline, 86 @90	"		.17@.22
Naphtha, crude, 68°@72°	bbl.		12.40
"Stove"	gal.		.15
Linseed, domestic raw	"		.34@.37
Boiled	"		.38
Calcutta, raw	"		.65
OZOKERITE	lb.		.11½
PAINTS AND COLORS—			
Chrome green, common	"		.03
Pure	"		.16
Yellow, common	"		.10¼
Best	"		.14
Lampblack, com'l	"		.04½
Refined	"		.07
Litharge, Am. pow'd	"		.05¾@.06
English flake	"		.08¼@.08½
Glassmakers'	"		.06¼@.08¼
PAINTS AND COLORS—	Cust.	Meas.	Price.
Metallic, brown	sh. ton		$19.00
Red	"		15 00
Ocher, Am. common	"		9.25@10.00
Best	"		21.25@25.00
Dutch, washed	lb.		.04¾
French, washed	"		.01¼@.01½
Orange mineral, Am.	"		.08½@.08⅝
Foreign, as to make	"		.08¼@.10¼
Paris green, pure, bulk	"		.12
Red lead, American	"		.06¼@.06½
Foreign	"		.06⅝@.06
Turpentine, spirits	gal.		.52@.52½
White lead, Am., dry	lb.		.05½@.05¾
American, in oil	"		.07@.09
Foreign, in oil	"		.07@.07¼
Zinc, white, Am., ex. dry	"		.04¾@.04¾
Foreign, red seal, dry	"		.03@.08½
Green seal, dry	"		.06¼@.06½
POTASH—			
Caustic, ordinary	"		.04½@.04¾
Elect. (90%)	"		.06¼
POTASSIUM—			
Bicarbonate cryst.	"		.08¼
Powdered or gran.	"		.14
Bichromate, Am	"		.08½@.08¾
Scotch	"		.08¾@.09
Bromide	"		.25@.38
Carbonate (80@85%)	"		.03½@.04¾
Chlorate, powd.	"		.07¼@.07⅝
Crystals	"		.07@.07⅛
Chromate	"		.35
Cyanide (98@99%)	"		.20
Kainit	lg. ton		9.30
Manure salt, 20%	100 lbs.		.66
D'le Manure Salt, 48@53%	"		1.12
Muriate, 80@85%	"		1.83
95	"		1.86
Permanganate	lb.		.09½@.09⅝
Prussiate, yellow	"		.13¾@.13½
Red	"		.34
Sulphate, 90%	100 lbs.		2.11
96%	"		2.14
Sylvanit	unit		.41
QUARTZ—(See Silica).			
SALT—N. Y. com. fine 280 lbs	bbl.		.72@1.18
N. Y. agricultural	sh. ton		4.40
SALTPETRE—Crude	100 lbs.		3.20@3.25
Refined	"		4.00@4 50
SILICA—Best foreign	lg. ton		10.00@11.00
Ground quartz, ord.	sh. ton		6.00@8.00
Best	"		12.00@13.00
Lump quartz	"		2.50@4.00
Glass sand	"		2.75
SILVER—Chloride	oz.		.65
Nitrate Crystals	"		.65½
Oxide	"		.85@1.10
SODIUM—			
Bicarb., ord., bulk f.o b. wk's.	100 lbs.		1.25
Extra domes., f.o.b. w'ks.	"		3.50
Foreign, f.o.b. N. Y.	"		1.60
Bichromate	lb.		.06¾
Carbonated ash, high test, in bags, f.o.b. works	100 lbs.		.75@.85
Foreign, f.o.b. N. Y.	"		.90@.92½
Caustic, 60@76%, f.o.b. w'ks.	"		1.65@1.70
Foreign, f.o.b N. Y.	"		1 50@2.00
Chlorate, com'l	"		.07¼@.07⅜
Hyposulphite, Am.	"		1.60@1.65
German	"		1.70@1.90
Nitrate, spot	"		2.05
Shipments	"		2.02½
Peroxide	lb.		.45
Phosphate	"		.02½@.02¼
Prussiate	"		.09¾
Sal soda, f.o.b. works	100 lbs.		.60
Foreign, f.o.b. N. Y.	"		.67½
Silicate, conc.	lb.		.05
Com'l	"		.01
Sulphate, com'l	100 lbs.		.82½
Sulphide	lb.		.01¾
Sulphite crystals	"		.02½
SULPHUR—Roll	100 lbs.		1.85
Flour	"		1.90
Flowers, sublimed	"		2.15
TALC—N. C., 1st grade	sh. ton		20.00
N. Y., Fibrous, best	"		10.28
French, best	100 lbs.		2.00
Italian, best	"		2.25
TAR—Regular	bbl.		2.50
Oil	"		4.60
TIN—Crystals	lb.		.22½@.23
Oxide	"		.45
URANIUM—Oxide	"		2.25@3.00
ZINC—Metallic, ch. pure	"		.07@.09¼
Carbonate, ppt.	"		.09
Chloride so ution, com'l	"		.02¼
Chloride granular	"		.04¼@.04¾
Dust	"		.04¾@.04½
Sulphate	"		.02½@.02¾

THE RARE EARTHS.

BORON—Nitrate	lb.	$1.50
CALCIUM—Tungstate (Scheelite)	"	.60
CERIUM—Nitrate	"	10.00
DIDYMIUM—Nitrate	"	35.00
ERBIUM—Nitrate	"	40.00
GLUCINUM—Nitrate	"	20.00
LANTHANUM—Nitrate	"	30.00
LITHIUM—Carbonate	"	1.35
LITHIUM—Nitrate	oz.	.60
STRONTIUM—Nitrate	lb.	.07¼@.08¼
THORIUM—Nitrate 40@50%	"	4.50
URANIUM—Nitrate	oz.	.25
YTTRIUM—Nitrate	lb.	40.00
ZIRCONIUM—Nitrate	"	8.00

Note.—These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts. Readers of the Engineering and Mining Journal are requested to report any corrections needed, or to suggest additions which they may consider advisable.